WESTERN GAS

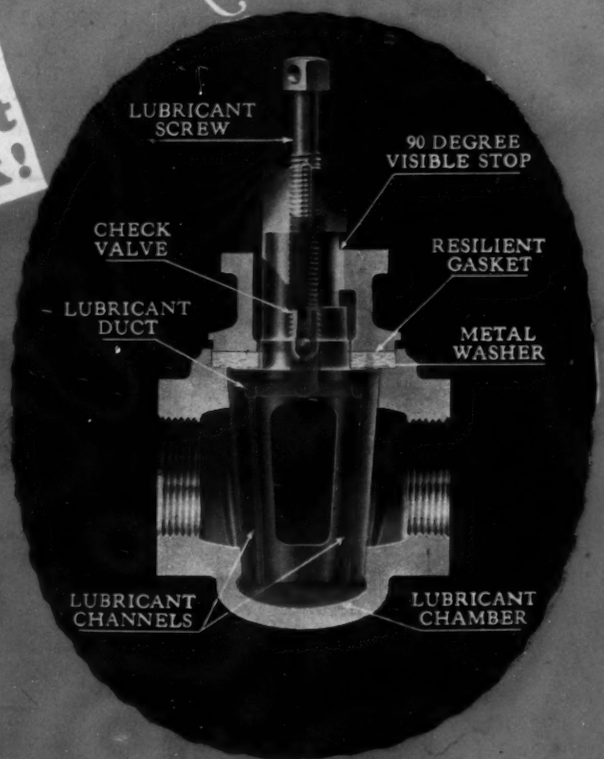
April 1927

20 Cents the Copy

Merco Nordstrom Plug Valves

— for gas & gasoline plants Lubricated

Won't Stick! Won't Leak!



A big step forward in valve design

Merco Nordstrom Engineers have developed the plug cock principle to the ultimate degree by embodying lubrication *under pressure* — thus insuring against the dangers of leaking and sticking. Particularly recommended for service in gas and gasoline plants. Ask for Catalog.

MERCO NORDSTROM VALVE CO.

SUBSIDIARY OF THE MERRILL COMPANY

Engineers—

San Francisco, 121 Second St.
Chicago, Peoples Gas Building
Cleveland, Ohio, 325 Engineers Building

Western Factory: Oakland, California

MERCO

Manufacturers

New York, 110 W. 40th St.
Houston, 1315 Petroleum Bldg.
New Orleans, 1501 Masonic Temple Bldg.

Eastern Factory: Belleville, New Jersey

AGENCIES IN PRINCIPAL CITIES

APR 18 1927 PERIODICAL DIVISION

A MONTHLY JOURNAL DEVOTED TO THE WESTERN GAS & APPLIANCE INDUSTRIES

SOUTHWESTERN
FACTORY BUILT

ABSORPTION PLANTS

A Factory Built Plant for every condition & capacity

Type 25
(PORTABLE)
2,500 to 3,000 Gallons

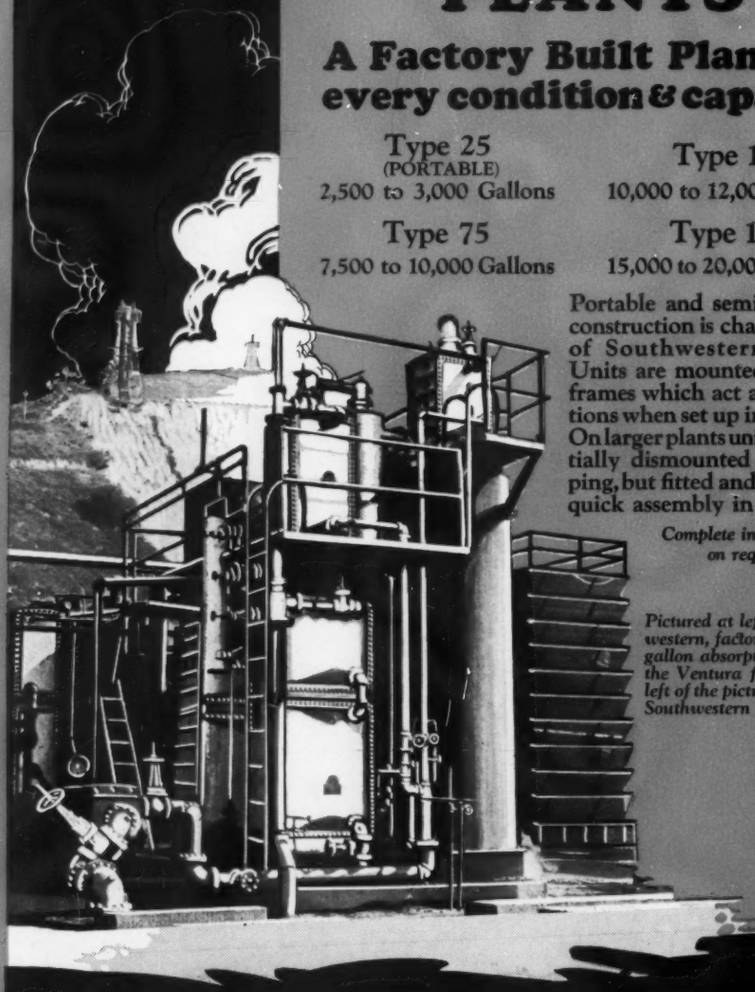
Type 100
10,000 to 12,000 Gallons

Type 75
7,500 to 10,000 Gallons

Type 180
15,000 to 20,000 Gallons

Portable and semi-portable construction is characteristic of Southwestern plants. Units are mounted on steel frames which act as foundations when set up in the field. On larger plants units are partially dismounted for shipping, but fitted and piped for quick assembly in the field.

Complete information on request



Pictured at left is a Southwestern, factory built, 7500 gallon absorption plant in the Ventura field. At the left of the picture is a small Southwestern portable.

SOUTHWESTERN ENGINEERING CORPORATION
LOS ANGELES U.S.A.

SOUTHWESTERN ENGINEERING CORP.

1221 HOLLINGSWORTH BLDG.
Los Angeles, Calif.

Offices
TULSA
AMARILLO, TEXAS
NEW YORK

Factories
CULVER CITY, CAL.
TULSA

THE SPECIAL FLUOR COOLING TOWER

REALIZING THE PREFERENCE OF A GREAT MANY ENGINEERS FOR THE OPEN OR ATMOSPHERIC SYSTEM OF COOLING, FLUOR ENGINEERS BEGAN THE DEVELOPMENT OF A TOWER SPECIALLY DESIGNED FOR PATENT TUBE SECTIONS OR PIPE COILS. THIS TOWER, THE FINEST THE TRADE HAS EVER KNOWN, IS SO CONSTRUCTED THAT THE WATER AFTER BEING COOLED IN THE UPPER PART OF THE TOWER, IS COLLECTED AND DISTRIBUTED DIRECTLY OVER THE TUBE SECTIONS OR COILS.

ALL OF THE EXCELLENT FEATURES OF THE FLUOR STANDARD TOWER, SUCH AS SIMPLE DISTRIBUTION, DOUBLE DECKS, WIND DEFLECTORS, PORTABILITY, ETC., ARE MAINTAINED IN THE "SPECIAL TOWER."

TWENTY-ONE OF THESE TOWERS HAVE BEEN SOLD IN THREE MONTHS AND ALL OF THEM ARE GIVING STARTLING RESULTS.

FOR INFORMATION WRITE OR CALL AND WE WILL HAVE ONE OF OUR ENGINEERS EXPLAIN THE NEW TOWER

FLUOR TOWERS ARE ALL PROTECTED BY PATENTS AND PATENTS PENDING

FLUOR CONSTRUCTION CO.

909 EAST 59TH STREET

LOS ANGELES **CALIFORNIA**

WESTERN GAS

626 S. Spring Street,
Phone TUcker 8982
Los Angeles, Calif.

447 Sutter Street
Phone GArfield 5383
San Francisco, Calif.

Official Publication Of The
Pacific Coast Gas Association

Contents for April

Reviewing a Year of Expansion for Natural Gasoline in the West 19
By George H. Finley

A 100-Mile Natural Gasoline Transmission Line 20
By F. B. Simms

New Billing Method Reduces Operatives and Speeds Work 22
By Wm. A. Lewis

Campaign Sales Place Ranges on Kansas City Gas Lines 23
By A. W. Baker

Gas In Cement Making 24
By Lee Holtz

Pacific Coast Gas Association 26

Editorial 28

Installation and Adjustment of the Oven Heat Control 29
By Harry R. Mayer

Natural Gasoline Practice in Mid-Continent and on West Coast Varies 30

This Month's Patents Pertaining to the Industry 31

A Chart for Computing Gas Line Flows 33
By W. L. Rifenberick and W. I. Steele

Friction of Gas in Pipe Lines Computed by Graph 35
By W. L. Rifenberick

Natural Gas Gasoline Operations 54

Natural Gasoline Plants of the West 58

JAY JENKINS, *Publisher*
GEORGE H. FINLEY, *Managing Editor*
H. ELLIOTT TAYLOR, *Associate Editor*
JAMES E. JENKINS, *Associate Editor*
CRAIG ESPY, *Advertising Manager*

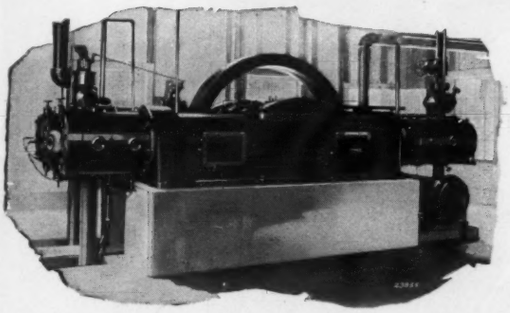
Volume III **April, 1927** **No. 4**

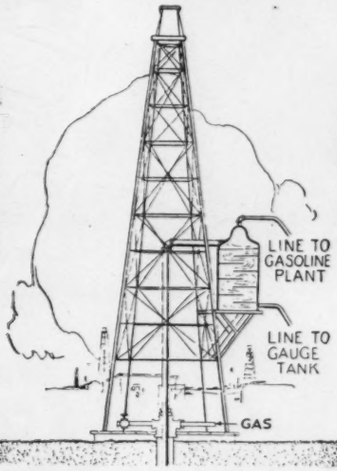
Western Gas is published by Western Business Papers, Inc. at 626 South Spring Street, Los Angeles, California. Subscription price (in advance) 20 cents the copy; $2.00 per year; 3 years $5.00; $3.00 per year foreign. Entered as second-class matter June 1, 1925, at the postoffice at Los Angeles, California, under the Act of March 3, 1879.

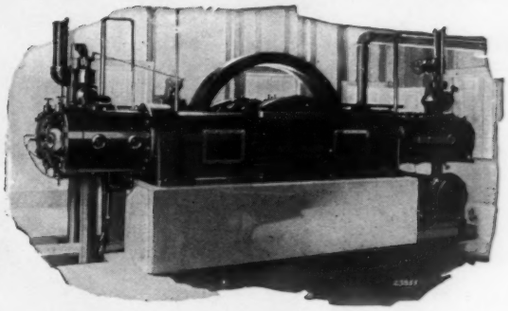
Copyright, 1927, by Western Business Papers, Inc.

Western Gas *is fully protected by copyright, and nothing that appears in it may be reprinted without permission.*

Compressors for Gas and Air Lift Pumping







Belt-Driven Compressors

This Type XOB Compressor has been designed especially for the oil fields. With extra-heavy rods, pins, and bearings, it is built to conservatively carry, when equipped with the proper cylinder combination, the maximum starting loads which it is liable to encounter on any installation.

The duplex construction makes it possible to change cylinders in the field to suit varying pressure conditions. This flexibility is possible only with duplex frame construction.

A complete line of these cylinders in different sizes has been developed to meet the varying pressure demands of gas lift work and gasoline extraction plants.

Ingersoll-Rand has developed a line of high-pressure gas compressors which are especially designed to meet all of the requirements of the gas lift and gas pressure methods of pumping used in the Mid-Continent and Western fields.

The Company's engineering department has taken a prominent part in working out the application of these processes to the various oil sands encountered in California, Oklahoma, Texas, Louisiana, and Arkansas. . .

The information secured has been accumulated through personal contact with work in the field, and accurate data on the correct application of these processes to to any specific set of conditions are available to customers.

Gas-Engine-Driven Compressors

This direct-connected, gas-engine-driven compressor has been developed for the gas and oil fields. It is especially adapted to installations where natural gas is the available fuel for power.

Combining, as it does, the power plant and compressing unit in one machine, the Type XG Compressor is economical in the use of floor space and high in efficiency.

Compressor cylinders for this machine have been developed in sizes to give practically any working pressure demanded by gas lift work or gasoline extraction plants.

The most popular of these have been stocked in our warehouses.

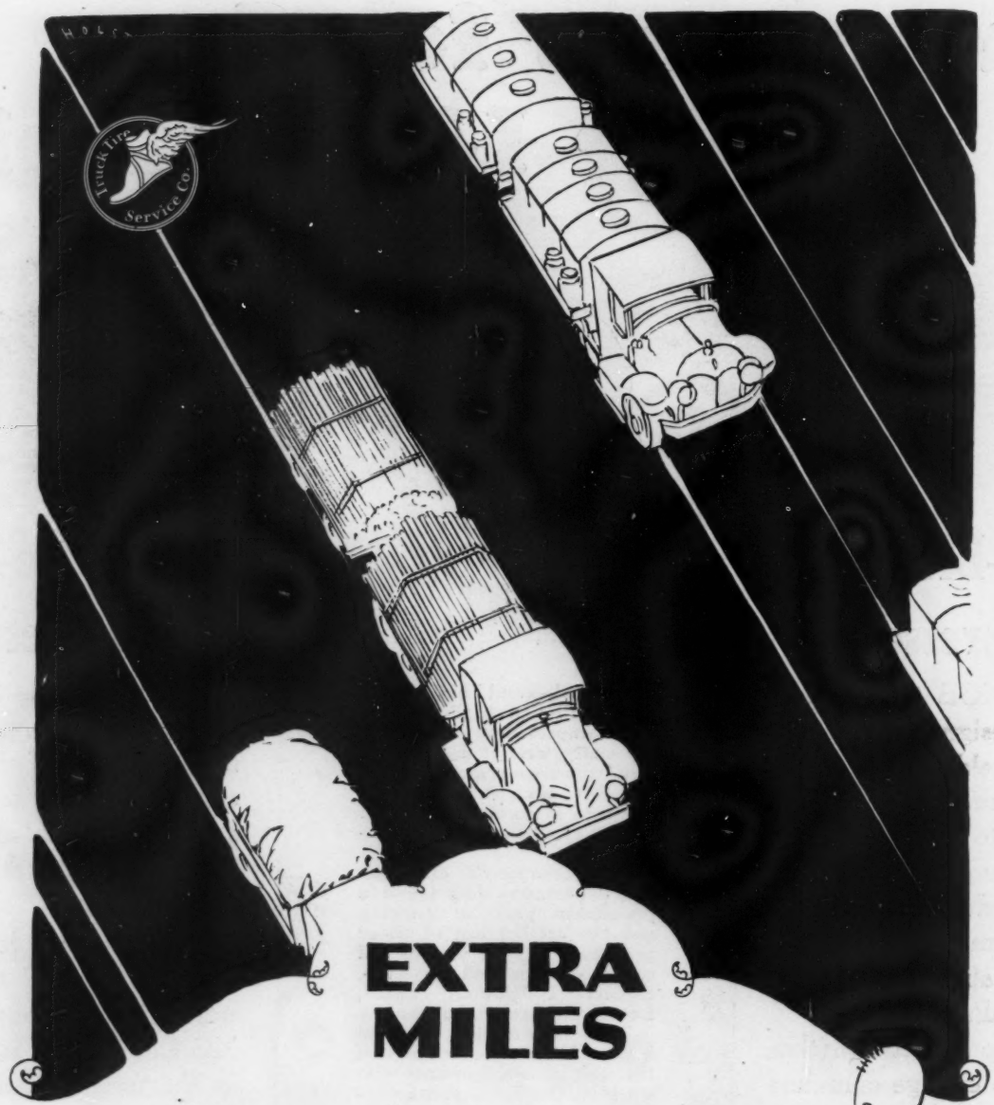
INGERSOLL-RAND COMPANY, 11 Broadway, New York, N. Y.

Offices in principal cities the world over.

Los Angeles, Cal.
San Francisco, Cal.
Dallas, Texas
El Paso, Texas
New Orleans, La.
Tulsa, Okla.
Seattle, Wash.
Salt Lake City, Utah

871-C

Ingersoll-Rand



EXTRA MILES

Extra miles mean extra profits . . . . and a lower per mile cost on the tire investment.

Operators of trucks and passenger cars in the gas industry are securing these extra, additional miles thru the use of Goodyear tire equipment.

They have convinced themselves thru actual comparison that Goodyear quality . . . . plus the modern facilities of TRUCK TIRE SERVICE invariably make for longer mileage at lower per mile cost.

"Charlie and me is the most tireless tiring guys you ever saw. Keep us busy and see if you can make us mad."
Yours, Hi.

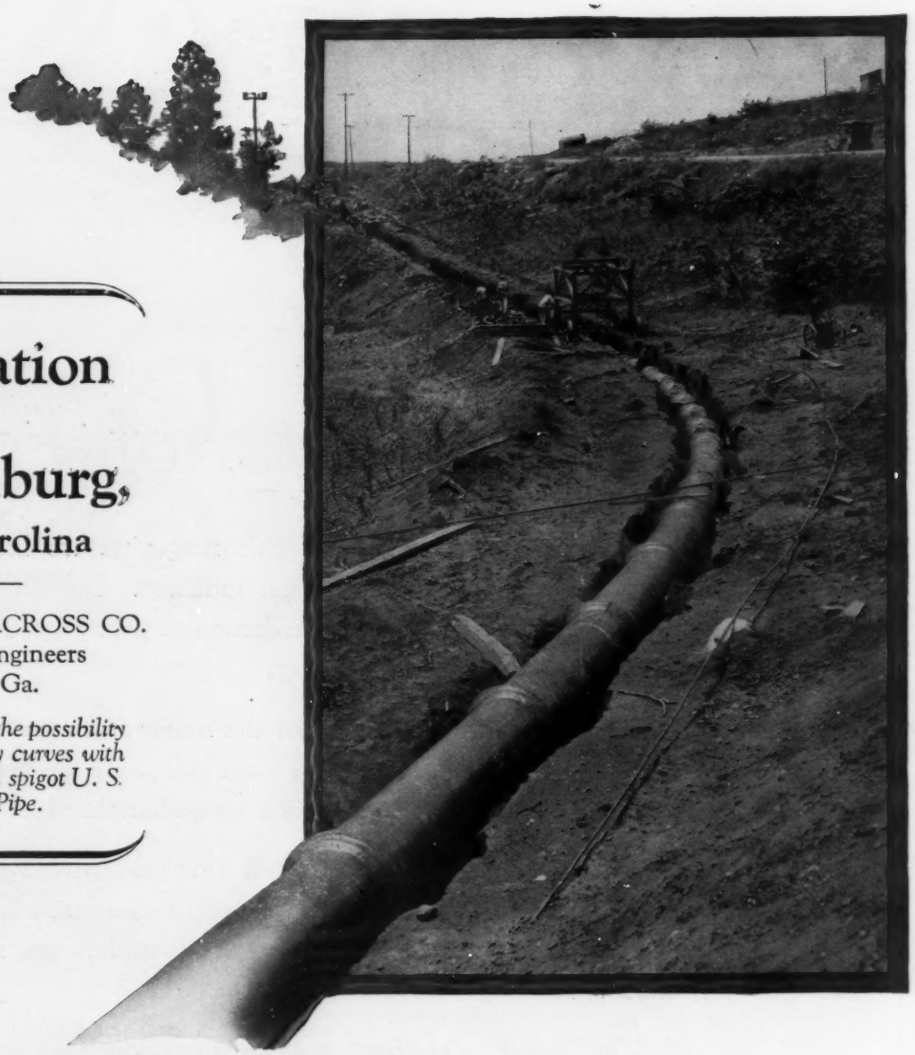
"A Tire for Every Need"

Truck Tire Service Co.

HOLLYWOOD
6523-Santa Monica Blvd.
Telephone HO-5524

LONG BEACH
220-East Anaheim
Telephone-62279

1244-East 8th Street — MEtropolitan 6391
LOS ANGELES CALIFORNIA



Installation at Spartanburg, South Carolina

SOLOMON-NORCROSS CO.
Consulting Engineers
Atlanta, Ga.

Illustration shows the possibility of laying long easy curves with full length bell and spigot U. S. Cast Iron Pipe.

This installation showed less than 12% of the allowable leakage

LEAKAGE TEST ON CAST IRON SUPPLY MAIN

Date of test	Dia. of pipe	Length tested miles	Duration of test hours	Initial pressure lbs. per sq. in.	Final pressure lbs. per sq. in.	Gals. water necessary to restore initial pressure	Leakage per inch dia. per mi. per 24 hrs.
5-7-26	24	2.77	2.0	70	70	50	9.0
5-6-26	27.56	7.57	2.0	40	40	200	11.52

Final tests, constant pressure maintained

United States Cast Iron Pipe & Foundry Co.
Makers of
deLavaud
Centrifugal
Cast Iron Pipe
PATENTED

Write for details of the service we maintain for the assistance of Construction Engineers

United States Cast Iron Pipe and Foundry Company

General Offices:
Burlington, New Jersey

SALES OFFICES

Philadelphia: 1421 Chestnut St.
Chicago: 122 So. Michigan Blvd.
Birmingham: 1st Ave. & 20th St.
Buffalo: 957 East Ferry Street
Cleveland: 1150 East 26th Street
New York: 71 Broadway
San Francisco: 3rd & Market Sts.
Pittsburgh: 6th & Smithfield Sts.
Dallas: Akard & Commerce Sts.
Kansas City: 13th & Locust Sts.
Minneapolis: 6th St. & Hennepin Ave.

The Gas Meter of Today

IN PRECEDING issues of this magazine we have outlined briefly the history of the gas industry. Particular emphasis has been placed on the fundamental part played by the Gas Meter in the success of the industry.

We have followed the story of the meter from the earliest days down to the present era. For more than 100 years the meter has held an enviable position in the industry's ever changing history.

In succeeding issues we shall tell how this instrument of measurement functions—of the reasons underlying its remarkable dependability—of its continuous accuracy even under the most trying conditions.

We shall seek to set forth some of the underlying principles and exclusive features which have been built into our meter. With a background of many years of meter manufacturing experience, we do not hesitate to offer our product, which has kept abreast of the latest developments, to the gas industry of today.

Pacfic Meter Works

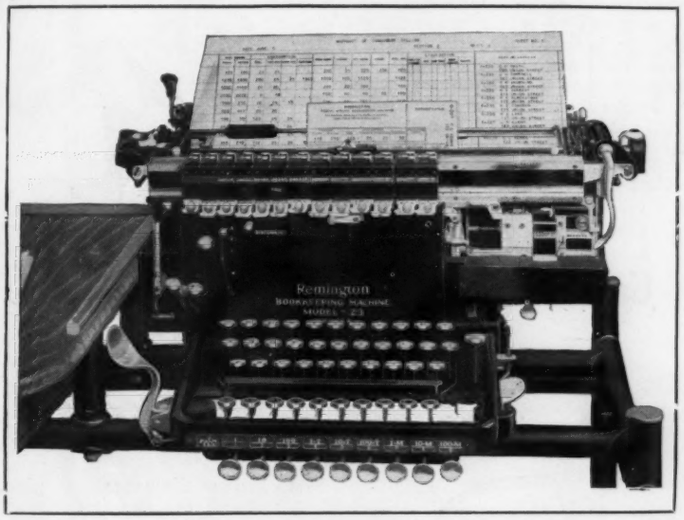
of the
American Meter Company, Inc.
Northwestern Representative

SAN FRANCISCO
495 Eleventh St.

PORTLAND
Northwestern Gas and Electric Equipment Co.

LOS ANGELES
2118 Atlantic St.

An outstanding achievement in accuracy



NOT one in more than 5,000,000 bills written since the installation of the REMINGTON PUBLIC UTILITY BILLING AND BOOKKEEPING MACHINES *has been returned with an error in the extension of the amount, the transcription of the readings, or the computation of the consumption.*

This extraordinary record of accuracy made by the Southern Counties Gas Company of California has probably never been equalled.

A complete breakdown of the consumption is secured as the bills are written, and it is only necessary to apply the various rates in order to secure a positive proof that every bill has been extended correctly.

The monthly bill represents the only point of contact between the company and a majority of its customers. It is therefore of vital importance that it be *accurate, neat in appearance,* and *easily understandable.*

The system used is known as the *Register Sheet Method of Ledgerless Bookkeeping.* This system was installed after an extended test of several other makes of machines and accounting methods. Under this system the Register Sheet is used as the Customer's Ledger Record.

This method of ledgerless bookkeeping has the following outstanding advantages:

1. Requires only about one-half as much filing space.
2. Greater speed of billing.
3. Greater speed of posting credits.
4. No misfiling of any customer's record.
5. Complete information concerning any customer's account, always available for the preparation of comparative statements, adjusting complaints, etc.

A demonstration of this machine as applied to your individual requirements will convince you, as it has a large number of other public utility officials, that it will *reduce your bookkeeping costs, eliminate your bookkeeping errors,* and *increase the efficiency of your bookkeeping department.*

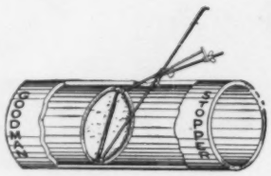
Write us or telephone the nearest Remington office and we will be glad to arrange for our representative to call on you at your convenience to discuss the application of both the machine and system to your particular problems, without any obligation on your part.

Remington Typewriter Company
Bookkeeping Machine Department
374 Broadway, New York
Branches Everywhere

Model 23 Remington

Public Utility Billing and Bookkeeping Machines

GOODMAN *IMPROVED* SAFETY GAS MAIN STOPPER



The genuine Goodman Stopper is instantly recognized by the name Goodman which appears on the Improved Patented Locking Sleeve. All genuine Goodman Stoppers are now equipped with this sleeve. Efficient as the Goodman Stopper has always been, the new locking sleeve makes the shut-off still more effective and positive. Stopper cannot slip—gas cannot pass.

All sizes 3 inches to 48 inches in stock. Special sizes on short notice.

SAFETY SERVICE PLUGS

Type "A"

Expansion Plug which fits into the bottom of the service tee and is quickly expanded by turning the wing nut which securely shuts off all gas. Sizes ¾" to 4"..

Type "B"

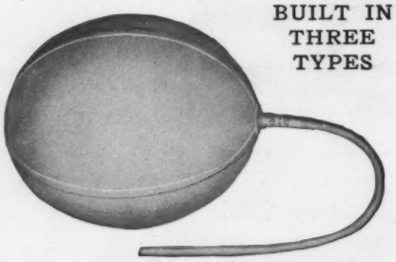
One piece Rubber Plug, taper shaped. Can be quickly applied to service tee. Fits wedge like and prevents gas escaping. Sizes ¾" to 4".

AIR LINE MASK

With or Without Blower

Dependable Gas Main Bags

BUILT IN THREE TYPES



Type A—Invisible Seams or Seamless Bag.

Type B—Reinforced Seams—heavier and stronger than Type A.

Type C—Canvas Covered Bags for use in mains coated with tar or oil.

When ordering specify type desired.

All Goods Sent on Approval

SOAP TAPE

A convenience to have on hand when searching for leaks in mains or services.

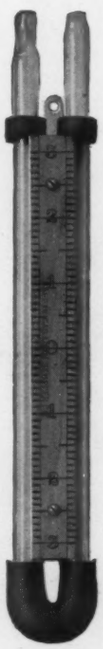
Strips 2", 4", 6" and 8" wide each, 40 ft. in length. Put up in sealed containers. Sample sent on request.

EXPANSION PLUGS FOR GAS MAINS

Fits inside diameter of pipe. Long shank reaches inside past the hub. Can be used in either hub or spigot ends. Standard sizes to 16".

"U" GAUGES

Portable Pressure Gauge for Distribution Men, Complaint Men, or around the Works.



SAFETY GAS MAIN STOPPER CO.

Pacific Coast Representative: C. B. BABCOCK CO., San Francisco

Cable Address: GASTOPPER, N. Y.

523 Atlantic Ave. **Brooklyn, N. Y.**

To gas company officials who must watch the *payroll*

An Accurate Gas Tapping Machine

For making large taps with a shell cutter on gas mains under pressure.
Made for extra-heavy work and constructed to withstand the hardest service. The combination shell cutter and tap makes the work much easier than with combined drill reamer and tap.
Accuracy is certain with the Number 30 machine. The machines are given a rigid test and thorough examination before leaving the factory which insures precision action. The Number 30 gas tapping machine makes taps from 2″ to 4″ in pipe from 4″ to 48″ inclusive.

Are old, wobbly tapping machines delaying your installation crews ten or fifteen minutes every time they tap a main? Those delays, occurring several times a day, every day, pile up a tremendous salary waste.

Old tapping machines that must be pampered and frequently repaired, that work slowly, that often turn out work which must be done over—they're not worth keeping! Retire those veterans!

Liberal trade-in allowance

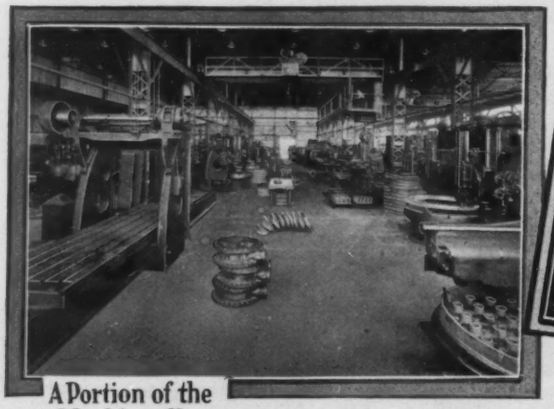
Subtract our high appraisal value from the cost of a new, efficient Mueller Tapping Machine and you'll decide that it's costly to keep your old machines in service. Write for details of trade-in plan!

MUELLER CO.
Established 1857
San Francisco: 1072-76 Howard St. 2468 Hunter St., Los Angeles
Factory: Decatur, Illinois
Canadian Factory: MUELLER, Limited, Sarnia

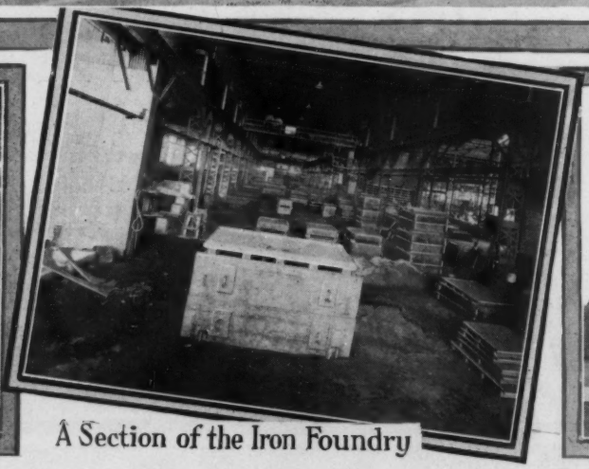
MUELLER

C.F.BRAUN & CO.

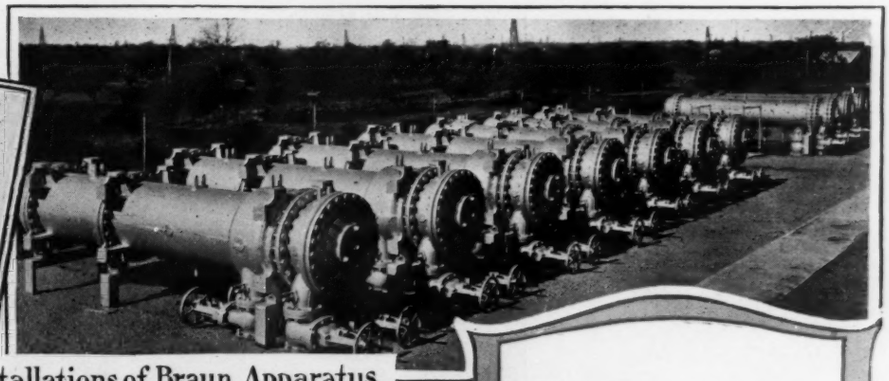
LARGEST METAL WORKING MANUFACTURING PLANT IN WESTERN AMERICA

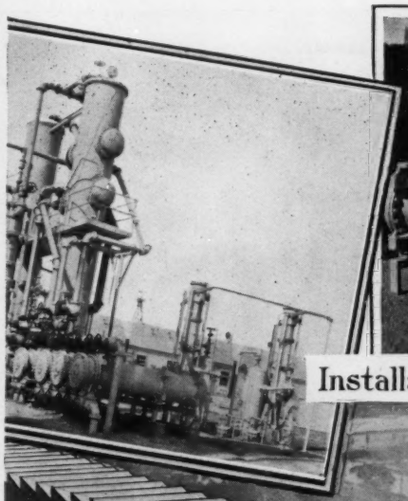


A Portion of the Machine Shop

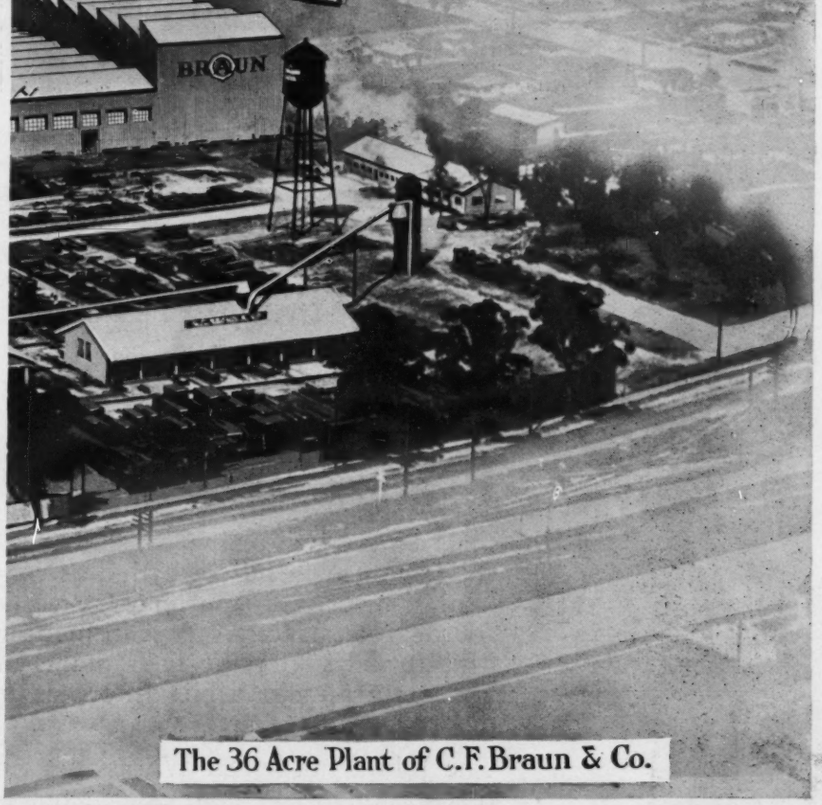


A Section of the Iron Foundry





Installations of Braun Apparatus

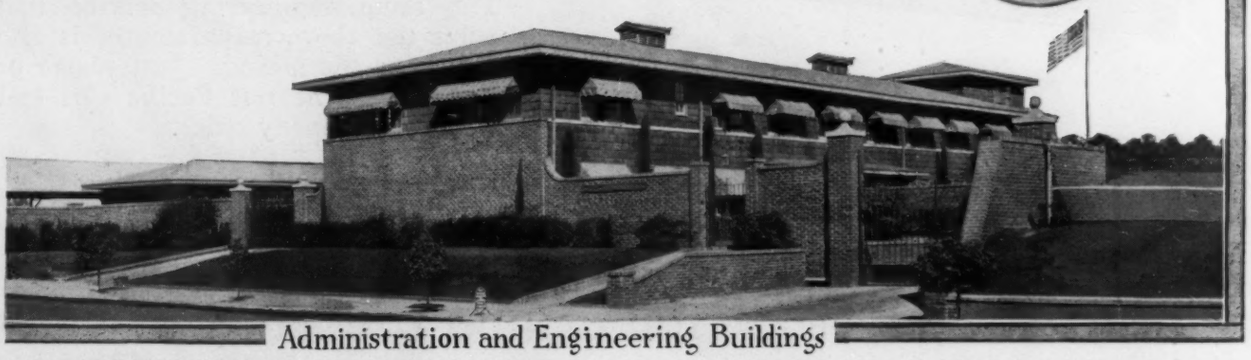


The 36 Acre Plant of C.F. Braun & Co.

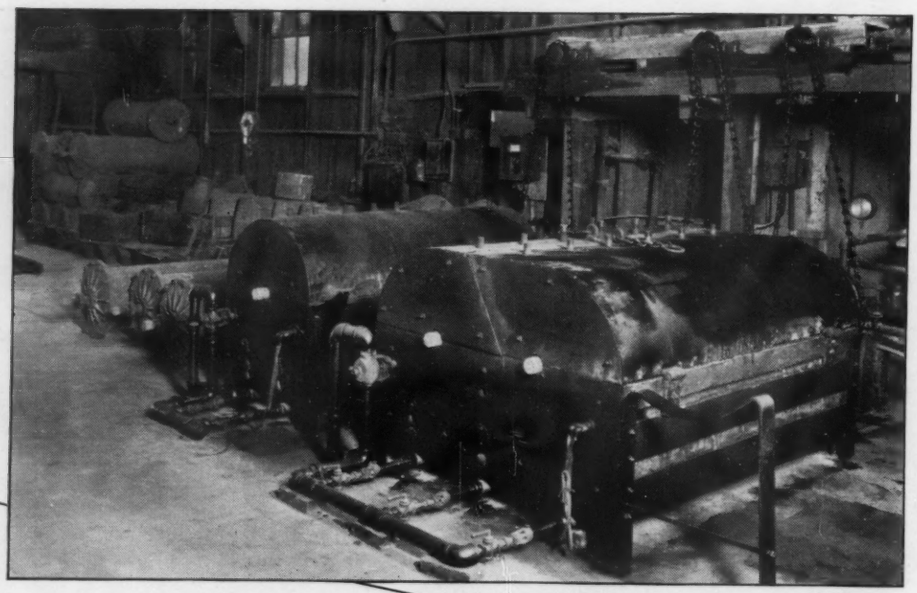
THE factory of C. F. Braun & Co., located on a 36-acre tract in the Los Angeles Industrial District at Alhambra, California, is the largest manufacturing metal working plant in Western America. The organization and facilities are most complete, consisting of research and testing laboratories; iron, steel and brass foundries; machine, welding and erecting shops; pattern shop and wood mill.

The manufactured product is highly specialized and completely covered by patents. The apparatus is used for the refining of oils and the manufacture of gasoline; in steam power plants and gas works and in industries where heat transfer is the required prerequisite in manufacturing processes.

Apparatus is shipped by C. F. Braun & Co., to all parts of the world.



Administration and Engineering Buildings



JOHN FINN METAL WORKS
BABBITT METAL, SOLDERS
ZINC DUST
GALVANIZING AND SHERARDIZING
384 SECOND ST. (SECOND AND HARRISON STS.)

SAN FRANCISCO, CAL. February 23, 1927

Pacific Gas & Electric Company,
445 Sutter Street
San Francisco.

Gentlemen:

Some few months ago we converted our oil equipment in the Metal melting Department and the Sherardizing Department into gas. After operating the same we find the change has been exceptionally beneficial, giving us a greater flexibility on the temperature control than we were ever able to obtain with oil heat. As temperature is one of the greatest requirements in both Sherardizing and Metal melting you can readily see that this new installation has been a great success.

Very truly yours,
JOHN FINN METAL WORKS,
Secretary.

R.B.FINN:S

(Above) Gas-fired sherardizing cylinders at the John Finn Metal Works, 384 Second Street San Francisco. (Below) Gas-fired solder and babbitt melting pots of the same company.

When the finer points of temperature make a big difference

Another metal works chooses gas

In Sherardizing—a process which coats objects with zinc by slowly revolving them in heated cylinders containing zinc dust—the temperature is 700 degrees, exactly. And in melting babbitt and solder the finer points of temperature make a big difference in the quality of the metal.

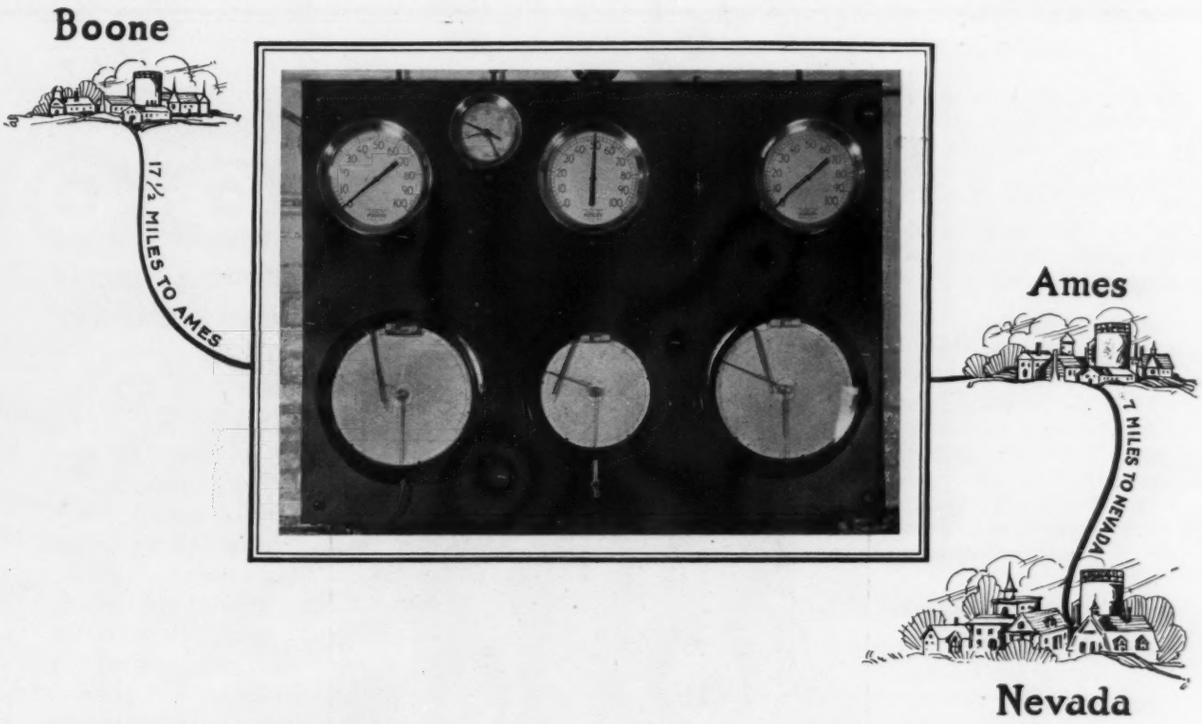
The John Finn Metal Works uses gas fuel to obtain and hold exact temperatures. For gas is easy to control.

P G and E engineers will serve you

The same engineering service that helps the above manufacturer is also yours for the asking. Just phone or write to the nearest Pacific Gas and Electric Company office.

PACIFIC GAS AND ELECTRIC COMPANY
P·G·and E·
Owned · Operated · Managed
by Californians

IF IT'S DONE WITH HEAT, YOU CAN DO IT BETTER WITH GAS



The First Long Distance High Pressure Gas Line in Iowa is Foxboro Equipped

Foxboro Instruments were chosen to equip the first long distance, high pressure gas line in the state of Iowa. This is the Boone-Ames Line of the Iowa Railway and Light Corporation.

Gas is manufactured at Boone, pumped 17½ miles to Ames and pumped 7 miles to Nevada. The average line pressure is 40 pounds.

The Foxboro Instrument Board above, located at Boone, contains an Orifice Meter (lower right) giving static and differential readings, a Recording Thermometer (lower left) with bulb installed on surge tank, an Indicating Gauge (top center) showing main line pressure, two Gauges (top right and left) indicating outlet pressure of compressors, and an Indicating Gauge with electric alarm attachment showing circulation water pressure.

Foxboro Instruments were chosen because the engineers believe that they are the finest it is possible to buy. And the growing number of gas plants which are fully Foxboro equipped is proof that their belief is justified. Foxboro Branch Offices are conveniently located near you.

THE FOXBORO CO., *Inc.*
Neponset Avenue, Foxboro, Mass., U. S. A.
WESTERN OFFICES
Los Angeles, 443 San Fedro St. San Francisco, 461 Market St. Portland, Ore., 816 Lewis Bldg.

New York Chicago Philadelphia Pittsburgh Detroit Boston Atlanta Tulsa Cleveland

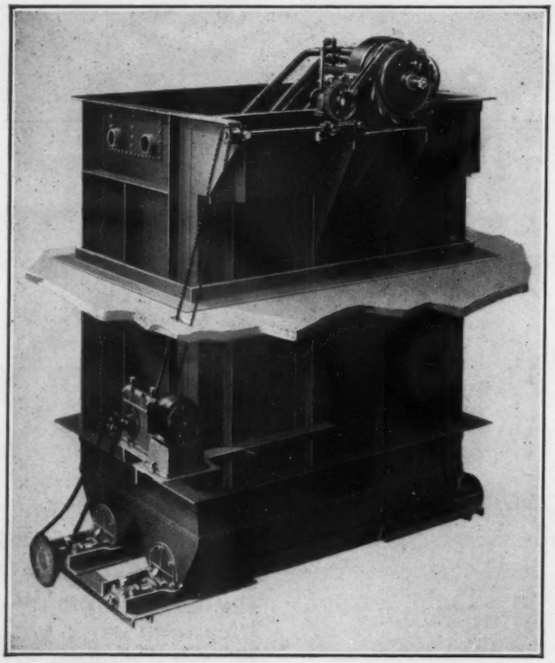
PEACOCK BROTHERS, *Limited*
1605 Delorimier Avenue
Montreal, Canada

FOXBORO
REG. U. S. PAT. OFF.
THE COMPASS OF INDUSTRY

Sole British Representatives
WALKER-CROSWELLER & Co.
58 Queen Elizabeth Street
London, S. E.

LAMPBLACK

can be handled
cleanly, economically and profitably
by Oliver-Borden Thickners
and Oliver Filters



Oliver-Borden Thickner with Steel Tank

The Pacific Gas & Electric Company
The Portland Gas & Electric Company
The Los Angeles Gas & Electric Company
The Central Arizona Light and Power Company
The New Bedford Gas & Edison Light Company

all use Olivers

Oliver Continuous Filter Co.

SAN FRANCISCO
503 Market Street

NEW YORK
33 West 42nd Street

LONDON
11 Southampton Row

JOHANNESBURG, SOUTH AFRICA
E. L. Bateman, The Corner House

RETAIN THIS PAGE FOR FUTURE REFERENCE

CROSBY

. . . . the name invariably found on valves and gauges where absolute reliability is demanded

Crosby Pressure Gauges

GAUGES manufactured by the Crosby Steam Gage and Valve Company have stood the test of time and live up to the definition of the word "gauge"—*"an accurate measuring instrument."* Accuracy is accomplished by mounting the pressure tube on the socket of the gauge rather than screwing it to the back of the case—the common practice in other makes. Eliminates inaccurate readings due to external strains on the case.

Crosby Recording Pressure Gauges

Employ the use of the Bourdon Tube instead of the helical spring, insuring longer life and greater accuracy.

Crosby Dead Weight Gauge Testers

Originated by Crosby years ago. Constant improvements have added to its efficiency.

Crosby Fluid Pressure Scales

An entirely new instrument designed to test gauges where pressure ranges exceed 1000 pounds. Manufactured in two types, one for pressures up to 2000 pounds and one for pressures up to 25,000 pounds. Exceedingly accurate, sensitive and ruggedly constructed.

Crosby Pop Safety and Relief Valves

An entirely new design in safety and relief valves, employing the use of a nozzle throat on the inlet side. Gives the valve much higher capacity, allowing the use of a smaller valve than heretofore. Made to operate to 1300 pounds and 900° F. Very desirable for use in cracking plants and stills for vapor relief. All parts subject to heat and pressure made of special steel alloys to resist corrosion.

Crosby Spring Seat Valves

Made of bronze for 250 pounds steam working pressure. Highly desirable for use on steam lines. Designed with replaceable seat and disc. Seat disc will not "wire draw."

Crosby Fullway or Boiler Blow Down Valves

Different from all other lever operated valves. Has double discs separated by a conical spiral spring causing contact with seats at all times. Self cleansing and can be installed with pressure on either side of discs with no leakage. Body fitted with male and female joints. Valve is operated by a simple lever, compound lever, or wheel. Operates where others fail.

Crosby Engine Indicators

Furnished for either gas, steam, Diesel engines, or ammonia compressors. Electrical attachments, cocks and reducing wheels also furnished.

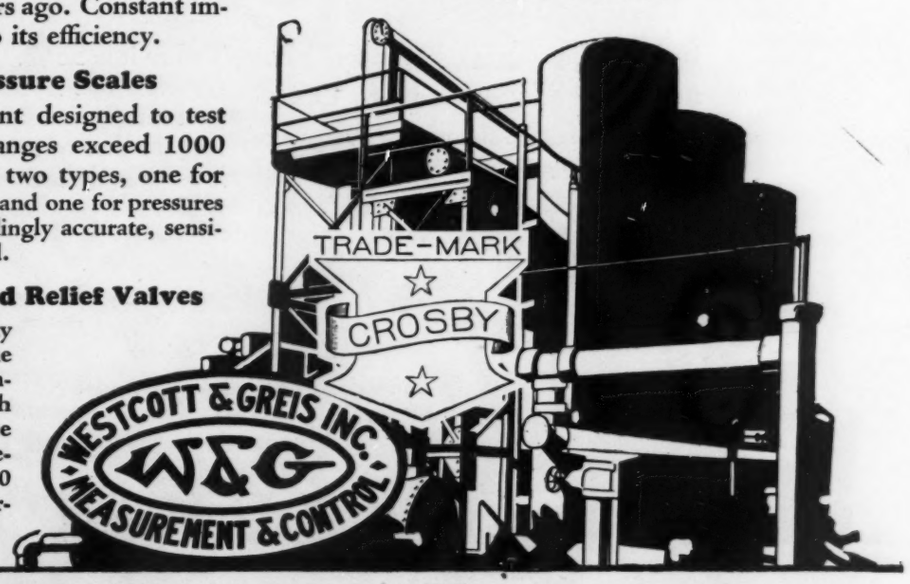
Our engineering counsel is yours entirely without obligation

WESTCOTT & GRIES, INC.

Sales and Service

1945 Santa Fe Ave. Los Angeles, Calif.

Phone: TRinity 8497



WESTCOTT & GREIS

CONSERVATION AND SAFETY

Billions of Bubbles Thoroughly Extract Natural Gasoline

The CAMPBELLS are coming!

Campbell progress has been phenomenal. Two years ago Campbell Oil-Froth Absorbers were extracting less than 8% of all natural gasoline produced in California. Today it is 58%. This great sweep forward has not been due to "high pressure" sales methods — but largely due to **repeat orders.** . . . . . Every installation has resulted in increased production . . . . . .

J. A. Campbell

Natural Gas Engineer

Consulting—Designing—Constructing

P. O. Box 669 **Long Beach, Calif.**

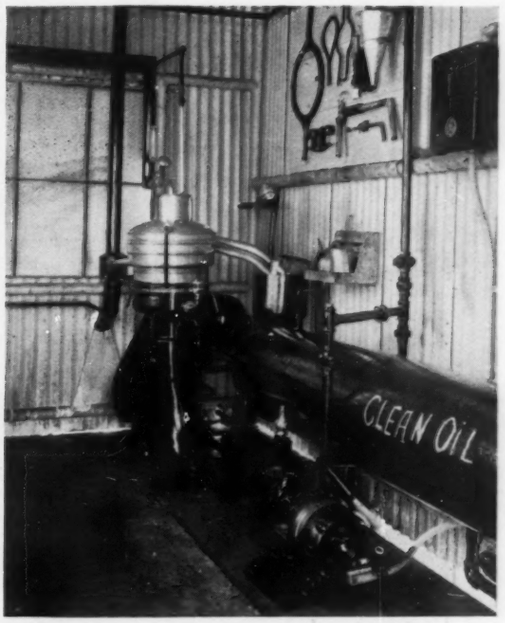
CAMPBELL

OIL FROTH

absorber

This De Laval Oil Purifier

assures better lubrication at lower cost for Southern Counties Gas Co.'s Compressors



De Laval Oil Purifier in the Ventura plant

MR. T. C. WALLACE, Plant Superintendent of the Southern Counties Gas Co., Ventura, Calif., in his article published in the March, 1927, issue of Western Gas, says:

"Our net conclusion with the De Laval Continuous Oil Purifying System is all in favor of that method, as it saves oil, saves labor, saves machines, reduces operating costs, improves efficiency, besides being a much cleaner oil-handling method than others we have used. * * * Savings in crank case oil amount to 50%, and operating conditions in the plant show marked improvement, especially noticeable in bearing adjustment. * * * The time required in changing oil, filling lubricators, and cleaning crank cases is materially reduced."

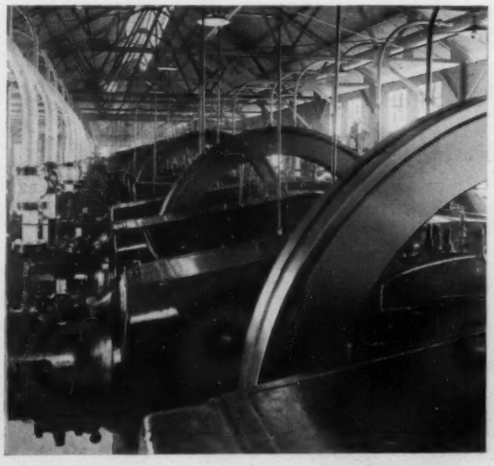
The De Laval Continuous Oil Purifying System draws the dirty oil from the crank case sumps of their thirty-two compressors, and pumps it to the De Laval Purifier. Here water, carbon, dirt, and other harmful impurities are centrifuged out. The purified oil is pumped to an overhead storage tank from which it flows back to the compressors.

Clean oil is thus fed to each of the units in a continuous unfailing stream. The same oil is used over and over again. This is a compressor plant adaptation of the purifying system used by most large electric power companies to lubricate their steam turbines.

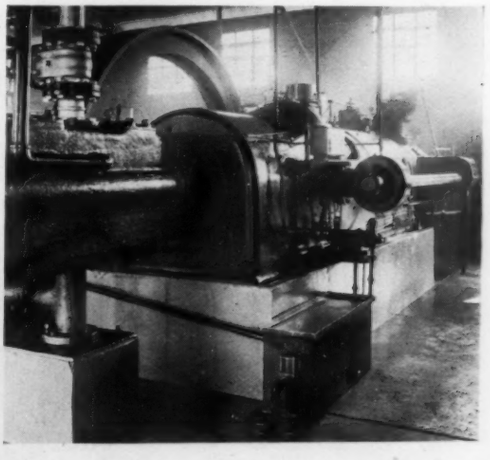
DE LAVAL PURIFIERS KEEP LUBRICATING OIL CLEAN

Write for full information, asking particularly for Bulletin 106-WG.

THE DE LAVAL SEPARATOR COMMPANY
165 Broadway, New York 600 Jackson Blvd., Chicago
DE LAVAL PACIFIC COMPANY, San Francisco
ALFA-LAVAL CO. Ltd., 34 Grosvenor Road, London S. W. 1.



Note the ½-inch pipes which carry purified oil to these compressors



Dirty oil outlet on one of the compressors. Note De Laval sight overflow

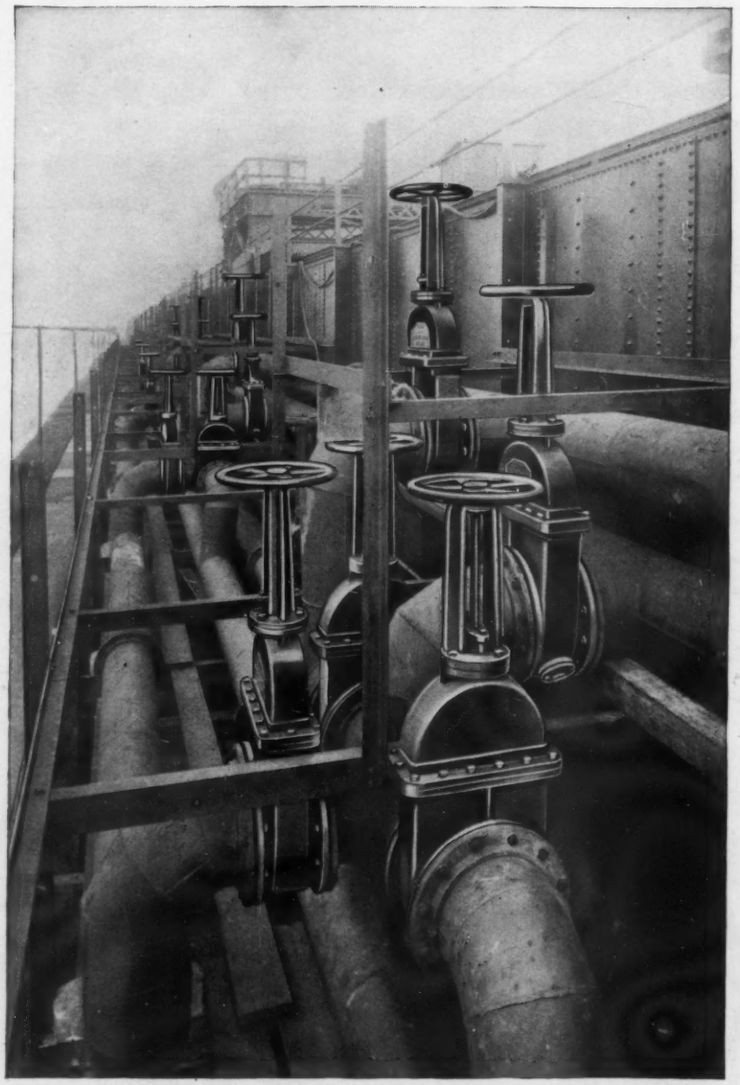
Steere Gate Valves

The failure of one gate valve may result in incalculable property loss or even in the loss of human life.

There is no piece of equipment around a gas works more vital than the gate valve. A valve that has not been designed and perfected for gas works service, may be a continuous menace to life and property.

We build absolutely the best valve we know how to make. There is no time nor pains spared in its making or in its final inspection.

The design is theoretically and practically correct. The wedging mechanism positively cannot act until the discs have seated. In opening, the wedging pressure is released before the discs begin to move, allowing them to lift free. The extremely rugged construction of all parts, especially the disc lifting and wedging mechanism, makes it as reliable after years of gas works service as when it left our shops.



61 All-Iron Steere Gate Valves and Steere Fabricated Steel Pipe. Furnished Detroit City Gas Company for Purifiers at Station "J"

We want to sell you our gate valves for your gas plant

May we send you our price list?

We try to keep every size in stock from 4-inch to 36-inch

SEMET-SOLVAY ENGINEERING CORPORATION
Division Allied Chemical and Dye Corp.
40 RECTOR ST. NEW YORK

APR 12 '27 ©CIB 739190

WESTERN GAS

A Monthly Journal of the Gas, Gas Appliance and Natural Gasoline Industries in *Western America*

Reviewing *a* Year *of* Expansion *for* Natural Gasoline *in the* West

By GEORGE H. FINLEY
Managing Editor, WESTERN GAS

IN the past decade the natural gas and oil industry in the West has produced an off-spring, in the young and flourishing natural gasoline industry, which has achieved a remarkably rapid and at the same time sound growth. At the present time there are some 150 plants operating in the several fields of California.

IN THE GAS FAMILY

Natural gasoline may claim a close kinship to the gas industry, for it is rendering a service that is almost an essential to efficient distribution of natural gas. The gasoline content of natural gas before the emergence of the natural gasoline company was a source of much trouble to gas transmission companies and to domestic distributors of natural gas. The gasoline plant is turning to profit what was formerly a source of inconvenience, and has taken an important place in the national program of conserving natural resources.

The natural gasoline industry has won its way in the face of many hazards of operation. Not the least of these is the market factor, for only to a limited degree can natural gasoline operations be made to the measure of current market demand. New gas production must be taken care of, regardless of the price the commodity is bringing. A case in point is seen in the present soft market, reflecting among other factors, the passing of the seasonal winter peak demand. Natural gasoline at this writing commands less than it has brought for years. Yet operators continue their expansion programs, erecting new plants and adding to old ones, as gas conditions demand, building for the future regardless of present narrow margins. Their confidence in the future of the industry rests on the essential nature of their commodity, for in spite of much search there has been developed no practical substitute for "casinghead" in the manufacture of good gasoline.

A few weeks ago *Western Gas* sent a questionnaire to natural gasoline companies in California, and in Wyoming. The purpose of the present article is to review the course of progress made in the past year by the major companies, as revealed in their answers to the questions circulated. Elsewhere in this issue is given a list of gasoline plants in California and Wyoming.

Since the industry follows oil development so closely it is manifestly impossible for the operators themselves to forecast with any accuracy what developments will be called for over a year's time. The only suggestion of what the next year will bring forth is that contained in the record of expansion made in previous years. Companies included in *Western Gas'* survey for 1926 produce a very creditable record for the year. Five California companies show a total of 11 new plants constructed, and major additions were made to another 11 plants by four California companies. In the following running story of the past year these new construction features are told of, and wherever possible the known plans for 1927 additions are given.

California Gasoline Company, at present operating 12 gasoline plants and one gas transmission plant, reports an active year. Its expansion program of new plant construction, additions, new gathering lines, etc., called for an expenditure of roughly a half million dollars. At Huntington Beach was constructed its Plant No. 16, with 8,000 M.C.F. daily capacity. The company's Montebello plant was increased in daily capacity from 2,000 M.C.F. to 4,000 M.C.F., and Plant No. 13, at Fillmore, a 1,000 M.C.F. capacity plant, was doubled in capacity. Two plants were shut down by the company, No. 14 at Santa Fe Springs and No. 8 at Signal Hill, gas formerly handled by these plants being diverted to Plant No. 9 at Santa Fe Springs, and Plant No. 7 at Signal Hill respectively.

The same company laid about 22.6 miles of gathering lines during 1926, giving a total of 120 miles of gas line operated.

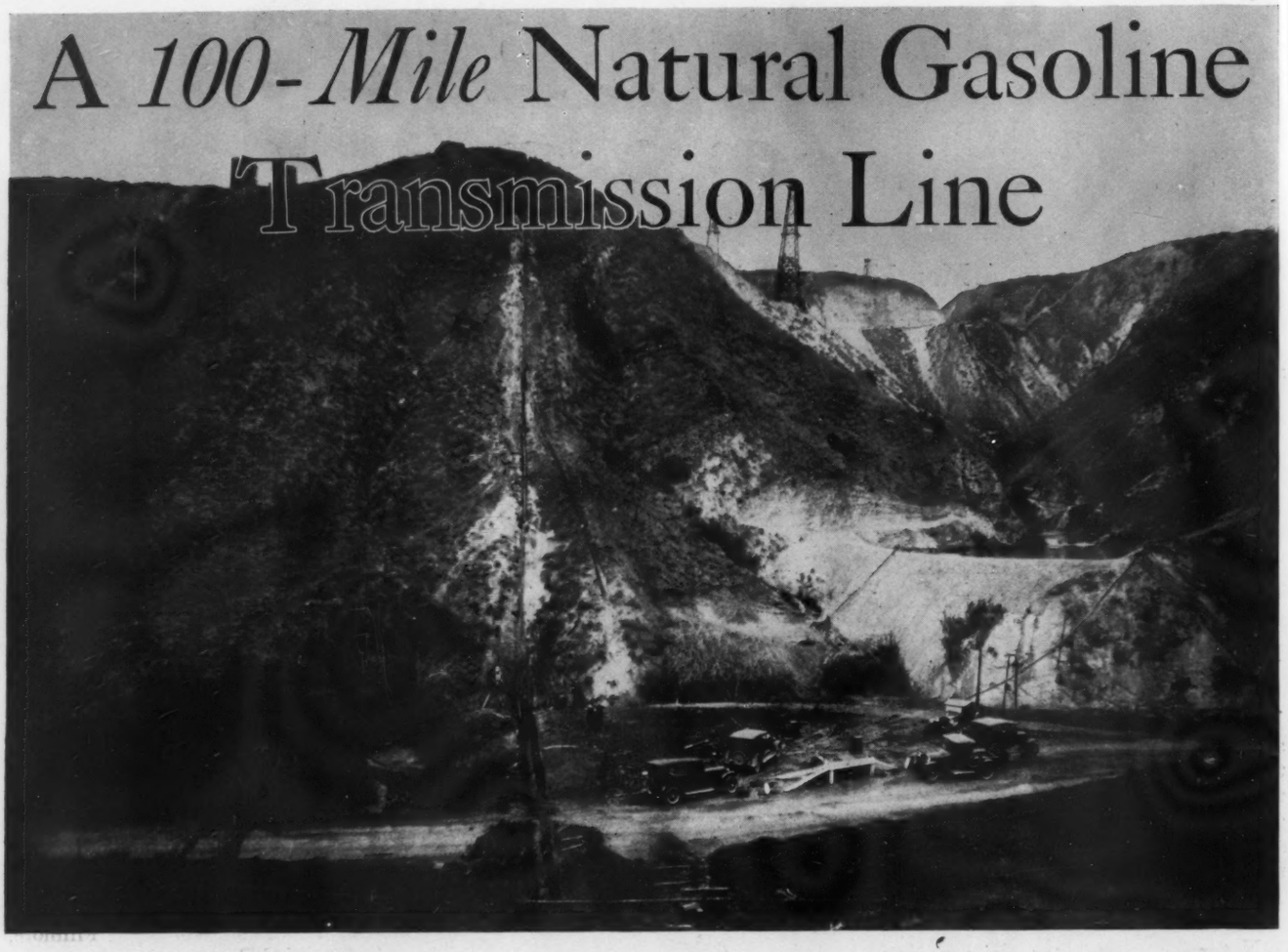
Thus far in 1927 the Pan American Petroleum Company, whose gas department operates four plants for the Pan American and the same number for the Petroleum Securities Company, has erected two new plants—its Ventura and Naples installations, each of 2,000 M.C.F. capacity. Additions to these plants are to be made this year.

FOUR PLANTS FOR RICHFIELD

Richfield Oil Company of California, which is the parent operating company of the Signal Hill Gasoline Company, has 15 gasoline plants and one gas transmission plant in its system. During 1926 four plants were built by this operator—the Huntington plant, 12,000

(Continued on Page 47)

A *100-Mile* Natural Gasoline Transmission Line



THE tremendous development in the manufacture of natural gasoline the past few years has brought along with it problems of conservation. Not only have advances been made in recovery and conservation within the gasoline plants themselves but greater economies are in effect in the storage and transportation of the finished product.

Anyone who has stood alongside a loading rack and watched gasoline being put aboard a tank car must have been impressed by the large amount of vapors released in the operation. Measurements of these losses have been carefully made and they run from a very small percentage up to as high as 15 or 20 per cent, and in some cases even higher. Over a period of months or years these losses in dollars and cents reach an astonishingly high figure, where any large amount of gasoline is handled.

The temporary nature of most gas fields will of course prohibit the installation of many long gasoline trunk lines but from those areas whose life seems reasonably to warrant, we will probably see the extension of more and more gasoline trunk lines, not only in California but in the Mid-Continent and other fields as well.

By F. B. SIMMS

Superintendent, Pipe Line Dept. Shell Company of California

¶ In this article Mr. Simms describes what is undoubtedly the longest pipe line in the West—probably the longest in the world—constructed as a natural gasoline carrier exclusively. In the past year California gasoline operators have built a number of other pipe lines, many of them long, for natural gasoline, showing that pipe line transmission over long distances is coming to be recognized as good practice.

Among other sizeable natural gasoline lines in California are: The 33-mile Brea-to-Wilmington three-inch line of the Shell Company; the 33-mile Brea-to-San Pedro six-inch line of the Union Oil Company; the newly completed 20-mile line of the General Petroleum Corp. from Brea to Vernon—a three-inch line; and the Standard Oil Company's 10-mile six-inch line from the Athens and Rosencrans area to El Segundo. No California lines of any length are more than a year old.

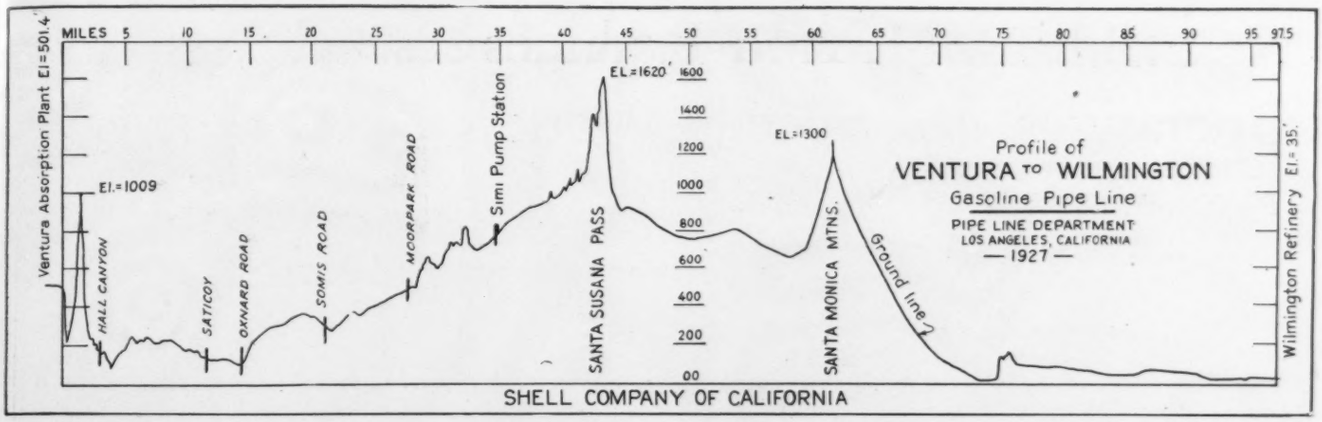
The four-inch pipe line now under construction by the Shell Company of California will transport gasoline from the company's plant in the Ventura Avenue field to its refinery at Wilmington, over a measured length of 97.5 miles.

The elevation of the Ventura end of the line is 500 feet and the Wilmington end is about 25 feet. Two mountain ranges are crossed. One is at Santa Susana Pass where an elevation of 1650 feet is reached and the other is the Santa Monica mountains which will be crossed at an elevation of 1300 feet.

It was necessary to pioneer to a certain extent in pressure loss mathematics in designing the line, as very little seems to have been written on the subject. In arriving at pressure losses we may say briefly that Williams & Hazan's formula was used and the differential in specific gravity between water and gasoline applied to our problem as a basis of arriving at the friction pressure loss.

Mannesman steel slip joint pipe is used in the construction of the line. This pipe, which combines lightness, strength and length, has during construction fully measured up to expectations.

To develop the proper hydraulic gradients at the elevations over which the line passes it was necessary to use two different sizes of pipe. Eighty-one miles of the line is of four-inch pipe and the balance, 16.5 miles, is six-inch. The four-inch pipe weighs 7.12 pounds per foot, while the six-inch weighs 10.2 pounds per foot. The joints average around 40 feet long, giving an economical welding total and due to the



lightness of the pipe, speedy handling all through the job. No difficulty was experienced welding this high carbon steel, experiments having first been made to determine the proper sized welding lip.

The design of the pipe line and the pumps was carried along together.

The pumps are multiplex 8-stage centrifugals, specially built to deliver the required quantity at the required pressures, the line and pumps being designed to handle 150,000 gallons per day at 600 pounds each. Two pumps will be used—one at Ventura and the intermediate pump at Simi. Due to the elevations over which the line passes the distance between the Ventura pump and the intermediate station is 33 miles and the Simi pump, owing to its elevation, will move the gasoline the remaining 64.5 miles. At Ventura a steam turbine will be used to drive the pumps, while the Simi pump will be electrically driven. A stand by pump is being installed at both pump stations.

An interesting control device is being installed at the Simi station which will make that pumping plant almost entirely automatic. This consists of a boiler rivetted steel pressure tank attached to which are four float cages. Two of these floats are set to operate a mercury switch which starts and stops the motor automatically, the other two floats being connected to ball bearing throttle valves, one on the suction line and one on the discharge line. These valves and floats are so set that a constant governable quantity of liquid is kept moving through the Simi Station at all times. When the Ventura pump shuts down, the Simi pump will automatically stop, the entire system being one of liquid level control. The automatic equipment is also of great value in the event of a line break, minimizing as it does the possibility of feeding gasoline into a broken pipe line.

The gasoline will be under pressure from the time it goes into the line at Ventura until it reaches the tanks at Wilmington, so the losses should be nil.

This arrangement and the fact that the pipe was laid with extreme care, it being tested hydraulically to 1000 pounds per square inch after being placed in position in the trench and all leaks made absolutely tight under that test, assures full protection against line breaks and operating difficulties.

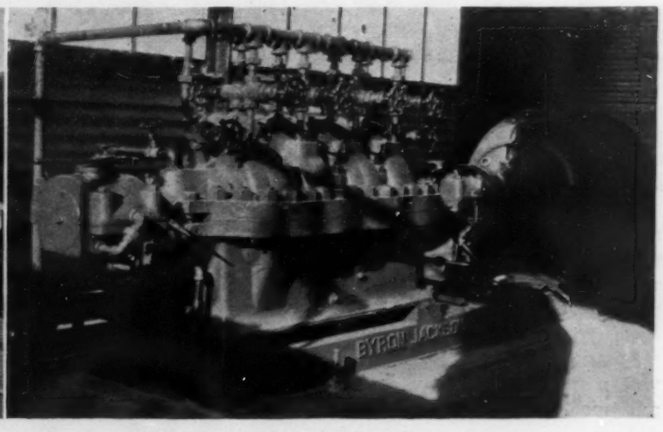
Under operating conditions the line will be patrolled twice daily by experienced men and every precaution taken to locate and repair any damaged sections of line promptly.

The matter of gas and air leaks is taken care of by properly located bleeder valves, and pressure regulator valves will be installed in places to take care of any excessive static head.

Some doubt has been voiced by a number of pipe line engineers as to the practicability of transporting gasoline through long pipe lines. Nothing in the writer's experience has tended to substantiate this doubt. In our opinion there is nothing to prevent the transportation of gasoline over the same distances as those traversed by crude oil pipe lines, provided of course, the project be economically sound.

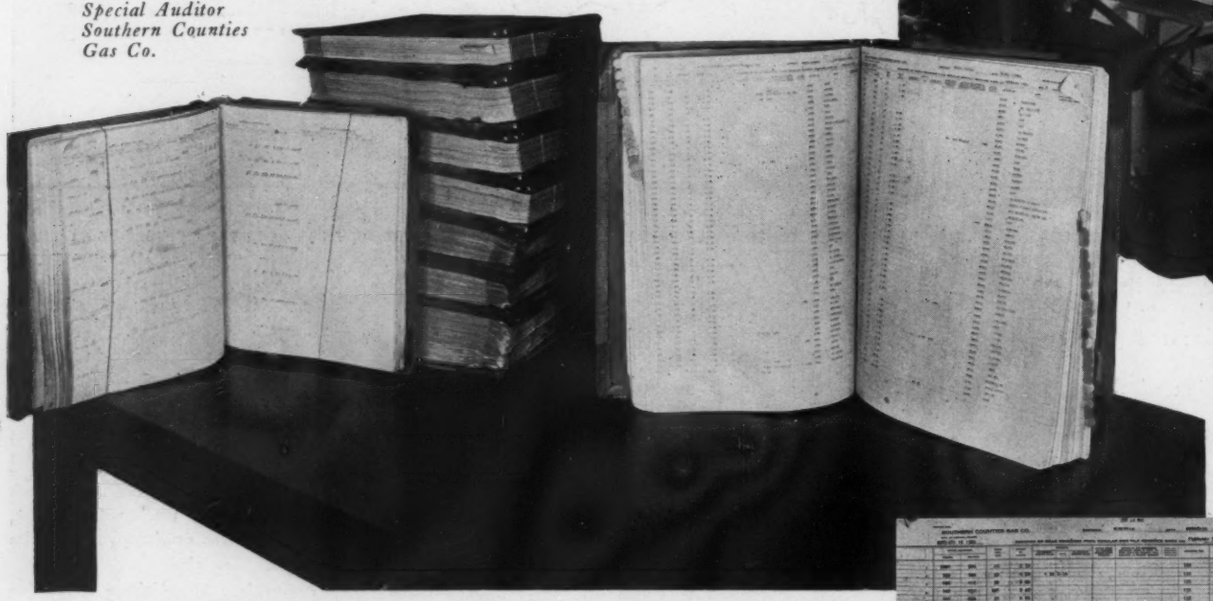
ILLUSTRATIONS:

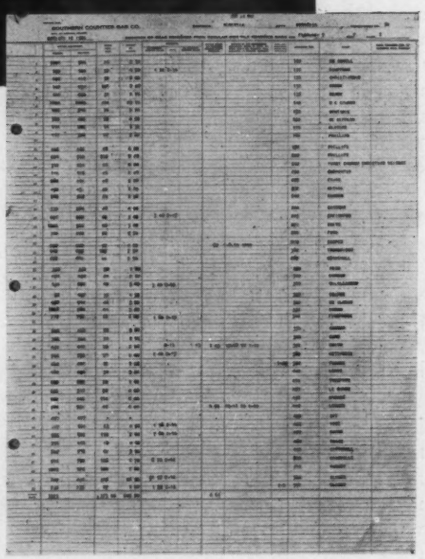
ON OPPOSITE PAGE: *Starting point of the Ventura-Wilmington natural gasoline line. The Ventura gasoline plant of the Shell Company is just over the ridge; a 250-foot (vertical) drop is taken by the line, at an angle of 45 degrees, as the illustration shows.* BELOW, LEFT: *Thirty-four miles from the Ventura absorption plant is located this booster station, at Simi. It is of fireproof construction throughout. In the foreground are shown the pressure tanks and the automatic control apparatus. Note that all valves are outside of the building. When completed the tank and control apparatus will be insulated, and will be protected from the direct rays of the sun by a shelter. All exposed pipelines will also be covered with fireproof insulation.* BELOW, RIGHT: *Centrifugal pump installation at Simi booster station. The specially designed pumps are 8-stage, centrifugal, driven by 150 h.p. General Electric motor. Normal operating capacity is about 125 gallons per minute against pressures up to 650 pounds per square inch.*



New Billing Method Reduces Operatives *and* Speeds Work

By WM. A. LEWIS
Special Auditor
Southern Counties
Gas Co.





TOP RIGHT: *Southern Counties Gas Company operator at work in Monrovia, Calif., office, using new type of Remington billing machine.* ABOVE: *Contrast the bulk of the former ledgers (left) with new type register (single book at right).* RIGHT: *A sample page from the Southern Counties' new register.*

THE "Socogasco" as we call our company among ourselves, is a comparatively young corporation, and started in quite a small way in 1911, when an entire year's gross earnings did not amount to half of what they are now in a month. Our accounting in the beginning was of course simple, and did not justify any great expenditure, either for equipment or for clerks. From necessity we began to "pick 'em young" and train them in the way they should go. Sometimes we picked good material and sometimes not; but in general the results have proven sufficiently satisfactory to crystallize the former necessity into a settled policy. When, early in 1924, it became apparent that our growth justified the installation of billing and posting machines as labor and time savers, we—the Traveling Auditors—who were instructed to experiment until we found a machine and a system which would meet our needs, realized fully that both must be so simple that we could break in our own operatives. We could not depend upon securing them fully trained.

After experimenting unsuccessfully at the Monrovia and San Pedro offices with an individual card ledger plan, it seemed that our needs called for original thinking. Since we were determined to have centralized machine billing and posting, and since no ready-made system met our needs, we had to go out and make one for ourselves.

The company furnishes gas to some sixty-odd communities in Southern California, from Santa Barbara on the north to Laguna Beach on the south; both on the coast and inland. At last count we had twenty-five commercial offices for orders and collections.. (There may be one or two more the next time we make the rounds—that's just how fast Southern California grows.) This number includes the central offices of the eight districts into which our organization is divided.

WHAT THE PROBLEM WAS

With pen ledgers, each of the subsidiary offices did its own billing and posting and made reports direct to the main office in Los Angeles. The problem was to devise some means by which all billing and posting could be centralized in the principal office of each district, and still provide the subsidiaries with all the records needed to give "Service with Courtesy." Was there any means by which duplication of work could be made labor-saving? And could any such plan be made simple?

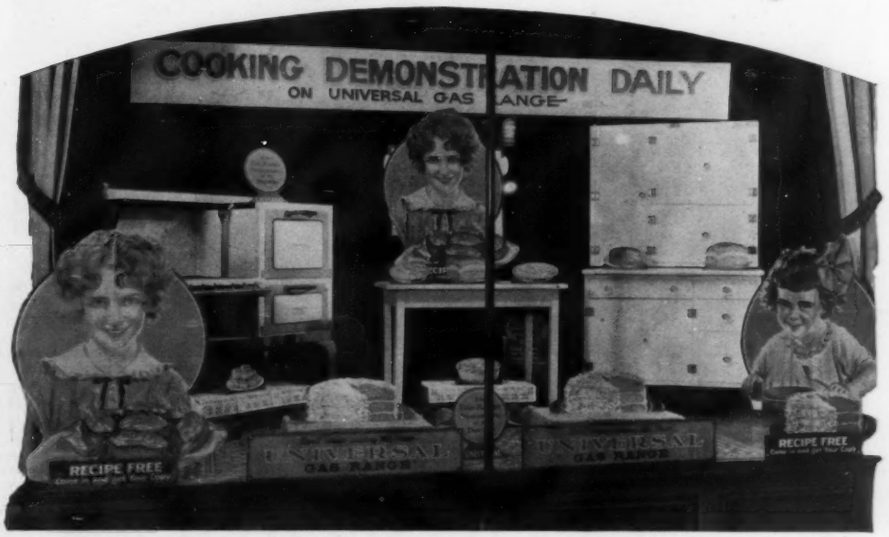
The answer is yes—provided somebody things it all out in advance and gives the workers a chart, by which they can work, whether or not they understand the whys and wherefores. We had to cut loose from many of our previous practices, and drill, drill, drill; but we are today assured that the new plan is just as popular with the rank and file, now that they have learned it, as its results are satisfactory.

We experimented with four different makes of billing machines before we decided upon the system they would be required to handle. Each make had its good points, but we finally decided upon the Remington because of its flex-

(Continued on Page 66)

ILLUSTRATION AT RIGHT:

One of the Kansas City window displays used during the Kansas City Gas Company's campaigning for gas range sales. Note how effectively the cooking demonstration feature is "humanized"



A. W. Baker

Campaign Sales Place Ranges *on* Kansas City Gas Lines

By A. W. BAKER
New Business Manager
Kansas City Gas Company
Kansas City, Missouri

¶A discussion presented at the American Gas Association's Midwest Sales Conference.

GAS range sales were a definite, carefully planned and co-ordinated part of our 1926 general sales budget. Our schedule of sales operations called for four thirty-to-sixty day gas range campaigns. Our idea was to do the desired annual volume of range business at favorable times and in a manner not to detract from the balance of our operations. Realizing that under this policy about 85 per cent of our annual business on ranges would be done during campaigns, we set reasonable selling prices when not campaigning and very attractive discounts when campaigning. This gave us a low gross profit, but the extremely rapid turnover actually cut our selling costs, enabling us to realize greater net profits than otherwise would have been possible.

In addition to our sales floor force we had a territory representative to each 1200 domestic customers, not including apartment houses. These men sold all domestic gas-using appliances, including house heating equipment, and devoted a more specialized effort to range sales during campaigns.

Our most successful campaign of the year was conducted early in 1926. I will outline it briefly.

Our publicity consisted of:

A carefully arranged and timed series of newspaper ads, covering all features of the campaign.

Window and sales floor publicity and trims to properly feature the stoves on sale.

Conducting demonstrations on the sales floor with short talks and distribution of manufacturers' publicity matter.

The time payment plan used was 75 cents down on any stove, regardless of selling price, and 18 monthly payments on the balance.

Shortly in advance of the campaign a limited number of educational meetings were conducted, with special training of the sales force on the merchandise to be sold. The final meeting was held the morning of the opening day of the campaign, at which quotas were assigned, prizes announced, and a genuinely enthusiastic and friendly competitive spirit created.

Manufacturers furnished several special representatives throughout the greater part of the campaign period.

During the campaign at the regular morning meetings each individual personally reported his results for the previous day, which were recorded on a blackboard with his total for the campaign to date. Individuals with exceptionally good results were placed in the spotlight by the division manager and given full credit for their unusual accomplishments, and there was no hesitation in calling attention to the low men and arranging with their district supervisors to assist them in solving their problem.

Campaigning is usually a 14 hour per day job. Our salesmen are employed with this understanding, and being on a commission basis they are willing to put in long hours. They also realize that each single campaign must go over in line with the reasonable but not easy quota set, as this is of vital importance to our annual schedule of operations.

During the period February 15th to April 15th, 2400 ranges were sold. All of these except 22 were full sized stoves with regulators, which was a substantial increase over the quota set.

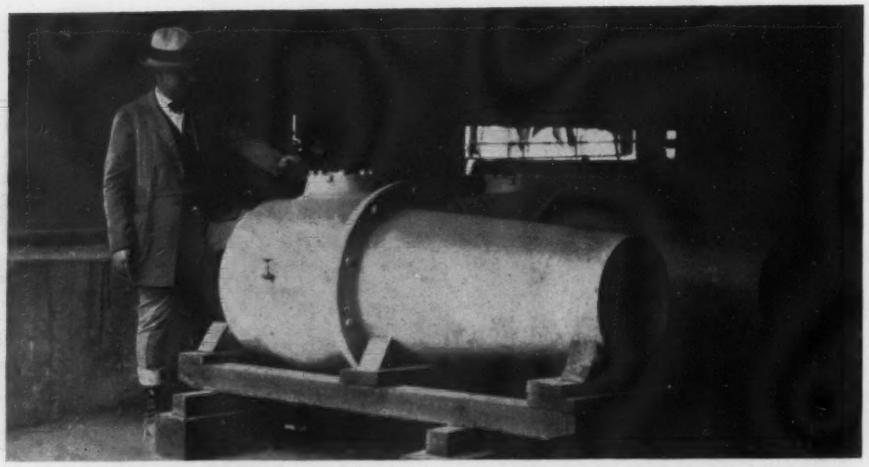
The three remaining campaigns of the year were conducted along the same general lines, and although not as successful as this one, quotas were made and we wound up the year with 6466 ranges sold, against a budget of 6,000, which was in line with our plans and satisfactory, and represents sales to 7 per cent of our domestic customers.

As my subject includes the holding and developing of the cooking load as well as selling gas ranges, I will outline briefly our situation in this respect in the Kansas Cities Companies and how we are handling it.

In 1924 the Kansas Cities Gas Companies were acquired by the Doherty interests.

For the three years 1923-24-25 these properties were selling roughly 5,000,000,000 cubic feet of natural gas annually to about 100,000 domestic and small commercial customers, but with

(Continued on Page 68)



LEFT: *Not a coast defense gun, as might be imagined, but one of the gas burners installed at the Monolith Cement Company plant near Tehachapi, Calif. Lee Holz, author of the accompanying article, is standing beside the burner to illustrate its giant proportions.*

Gas *in* Cement Making

By LEE HOLTZ

THERE is probably no material that is as enduring or suitable for foundations, walks, city streets, lamp posts, etc., as cement concrete. On every hand we see cement used in some form or another and when we stop to consider what has been accomplished in the 102 years since the Englishman, John Aspdin, discovered Portland Cement, and that there are many future possibilities yet in store, we do not wonder at the progress of this already gigantic industry.

Some idea of the increasing demand for cement products is shown by the fact that in the year 1913 only 82,000,000 barrels of Portland Cement were produced in the entire United States. In 14 years, consumption has been increased to over 164,000,000 barrels per year. California, alone, ships approximately 1,000,000 barrels per month from its 11 plants.

In California, Portland Cement is manufactured from two raw materials, namely, limestone and clay. These materials must be so proportioned that in the finished cement, silica, alumina, iron oxide and lime will be present in a certain ratio which must be maintained within close limits.

In the manufacture of cement two methods are most commonly employed; the wet process and the dry process. While the procedure and method of handling of the raw material in either process is decidedly different, the problems that confront the management and mill superintendents are similar. One of the big problems is the burning of the raw material, which in either wet or dry plants is much the same procedure with the same expected results.

While the burning of cement clinker with natural gas is comparatively new on the Pacific Coast, it is by no means a first experiment in the cement business; natural gas was used quite extensively in Kansas and Oklahoma 12 to 15 years ago. At the present time, in these states, gas is used in connection with pulverized coal; the gas supply in that section is not sufficient to take care of all requirements.

¶ The Monolith Cement Company is the latest addition to the large industrial users of the Midway Gas Company. Monolith is located about four miles east of the town of Tehachapi, Calif. To reach this consumer Midway Gas Company built a line consisting of 33.5 miles of 8⅝-inch O. D. and two miles of 6⅝-inch O. D. In passing over the Tehachapi range an extreme elevation of 4100 feet was reached, the smaller size pipe being used at these altitudes.

The line was placed in service on Nov. 17, 1926, after a record installation of nine weeks. It is built for a capacity of about 10,000,000 cubic feet a day, under average pressures.

Lee Holtz, Assistant Superintendent of Distribution, Southern California Gas Company, assisted in the installation and testing of the giant burners at the Monolith plant. The accompanying article by Mr. Holtz outlines the process of cement manufacture and points out the advantages of gas fuel in this industry.

In order that the reader may have a better understanding of a cement-burning installation and what is expected of gas as a fuel in the making of better cement, we present the following discussion of the recent installation at the Monolith Portland Cement Company's plant at Monolith, California, which is situated approximately 117 miles north east of Los Angeles.

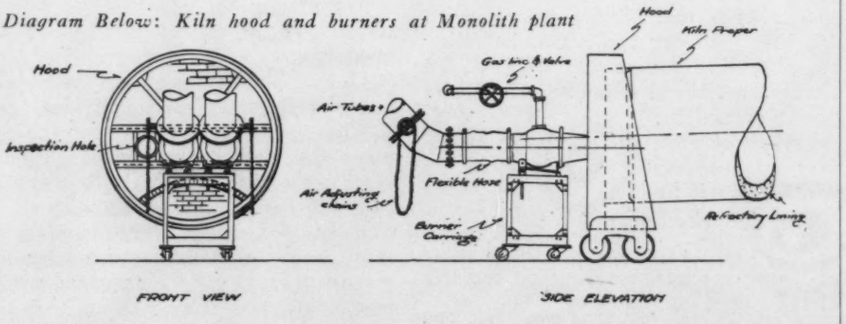
The process of manufacture at the Monolith plant is the wet method. All raw material is quarried close at hand is easily transported to the mill by steam and is easily transported to the mill by steam dinkeys and twenty car trains.

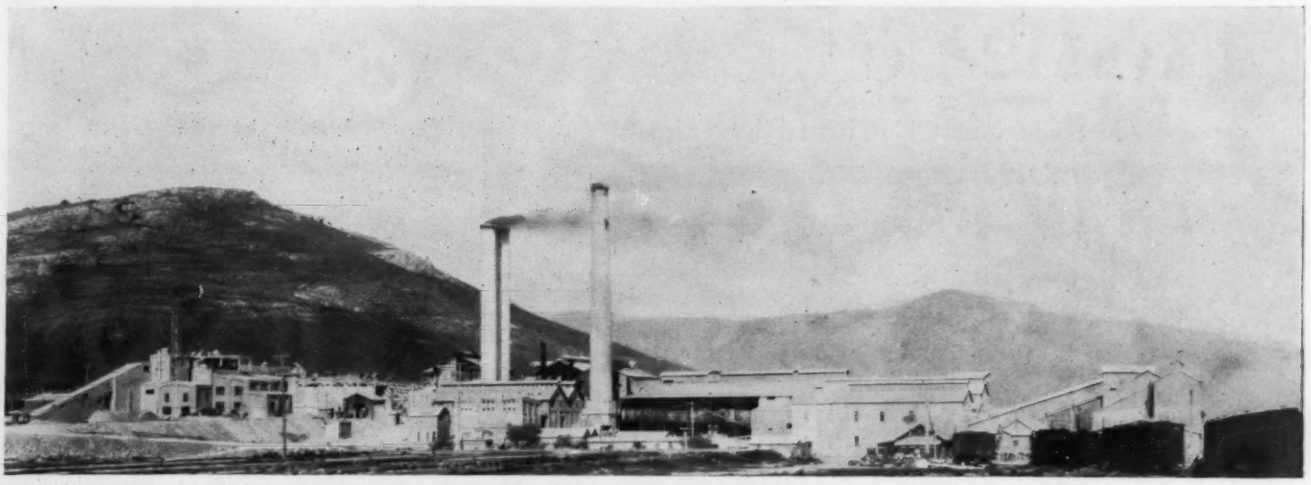
The material is proportioned by means of poidometers and run through pulverizing mills. The grinding is carried on wet, which is considered the most efficient method from a power and capacity standpoint. The proportioned mixture from the pulverizing mills is run into slurry tanks where it is agitated thoroughly by means of air and paddles.

The slurry, a thin mud-like mixture, is then run into what is known as correction tanks where slurry from other tanks is mixed to give the correct mixture to be fed to the kiln feed tanks. The measured slurry to each kiln is carried by gravity from the feed tank, located back and above the kiln.

The kilns are four in number. Three are 9½ feet in diameter in the burning

Diagram Below: Kiln hood and burners at Monolith plant





General view of the Monolith Cement Company's plant, which has recently been put on the lines of the Midway Gas Company as a large industrial consumer.

zone and 200 feet long and one is approximately 11 feet in diameter in the burning zone and 200 feet long. All kilns have a slope of about 3/8-inch per foot from front to rear and are known as the rotary type, driven by electric motors and direct connected. Each kiln operates as a separate unit. Owing to the slope and revolving motion the raw material gravitates through the calsining zone of the kiln where a temperature of about 2600° Fahr. is maintained. At this point all carbonaceous matter is driven off in the form of carbon dioxide.

The clinker leaving the kiln is picked up by a pivoted bucket conveyor and transported to the storage nearby, where it is allowed to cool before the final grinding and sacking.

Each of the three 9½-foot kilns are equipped with two 17½-inch Kirkwood burners weighing approximately 900 pounds each and capable of delivering approximately 800 cu. ft. of gas per minute at one pound pressure. The burners are mounted on steel carriages constructed side by side, somewhat resembling coast defense guns or trench mortars. The burners are set two to the kiln, and are adjustable.

The large kiln is equipped in exactly the same manner as the three smaller kilns, except that the burners are 23½ inches in diameter and weigh approximately 1200 pounds each, with a delivering capacity of 1200 cu. ft. per minute at one pound pressure.

The "Kirkwood" burner consists of an outer and inner casing, forming a circular space into which space a large number of small pipes having fine holes are introduced. An opening is provided for introducing the gas into the circular space from which the gas escapes through the small pipes and comes out of the small openings in a number of fine jets. Air is blown through the burner and produces a proper mixture of gas and air for combustion. The spiral arrangement of the pipes sends the gas into the air with a whirling motion which gives a thorough mixture of gas and air.

An air blast of from five to eight inches of water pressure is introduced at the back of the burner and is regulated by means of a butterfly valve located approximately 10 feet from the burners in the air duct from fan to burner.

The three small kilns are equipped with No. 80 Sturtevant Turbovane Fans capable of delivering 18,500 cu. ft. of air per minute at five inches water pressure. Each of these fans is driven by a 20.6 H. P. direct connected electric motor at a speed of 1460 R.P.M.

The large kiln is equipped with a No. 85 Sturtevant Turbovane Fan capable of delivering 33,000 cu. ft of air per minute at five inches water pressure and is driven by a 36 H.P. direct connected electric motor at a speed of 1460 R.P.M.

CONSTANT PRESSURE ESSENTIAL

The matter of constant pressure and even gas supply is one of considerable importance. The operation must be dependable owing to the fact that kiln shut-downs or any conditions that will tend to cut down kiln production are very costly to the manufacturer.

To insure the most dependable service possible, two eight-inch soft seat lever type regulators are placed in parallel at the meter set-up, a short distance from the mill, and two near the kiln room. However, only one regulator of each installation is in service at any time, the other one acting as an auxiliary adjusted to perform instantaneous service in case the regulator in use fails to function properly. The fact was also considered that the plant location being approximately 4000 feet above sea level, cold weather is experienced during the winter months, and due to the rapid expansion of gas when flowing at a rate of 325,000 cubic feet an hour with an initial pressure of 125 pounds per square inch, there may be a tendency for a regulator to freeze and stick.

The pressure is reduced twice before entering the kiln room header. At the meter there is a reduction from 125 pounds to 20 pounds, and at the kiln room the reduction is from 20 pounds to 6.5 pounds. The header runs the full length of the kiln room and is 18 inches in diameter. A header of this dimension is considered very essential from an operating standpoint as it not only acts as a reservoir back of the burners but maintains a pressure absolutely constant when a kiln is shut down for some mechanical trouble or other reason.

All kilns are equipped with sub-orifice meters for measuring each kiln's daily consumption. Pressures on the burners are also recorded for the operator's control.

All kilns are equipped with sub-orifice meters for measuring each kiln's daily gas consumption. Pressures on the burners are also recorded for the operator's control.

In burning clinker there is a point in the burning zone generally within twenty to forty feet of the discharge end of a kiln where there is a tendency for "rings" of partly fused material to form inside the kiln. These "rings" often have to be punched and broken down to allow material to flow freely through the kiln. This punching takes time and causes some loss of production. It is found that when gas fuel is used for burning, these clinker rings are formed less frequently than when oil is used as fuel; consequently some considerable saving is experienced through more uniform operation of kilns with the use of gas as fuel.

PACIFIC COAST GAS ASSOCIATION

A Department Conducted by Clifford Johnstone, Executive Secretary

Executives!—Know Your Brother!

IN A RECENT issue of an electrical journal there appeared an editorial deploring the absence of central station executives from a commercial gathering sponsored by an electric association. The editorial points out that the absent executives missed an opportunity to give inspiration to their subordinates and to gain inspiration and knowledge for themselves.

This strikes a responsive chord in the hearts of all of us. Indeed, the executives themselves would be touched were they to think back to the days when a little sympathy and inspiration from the Boss meant as much to them as it does to the rank and file of today.

Unfortunately the thing goes deeper than this and becomes the one thing which most handicaps accomplishment by our associations. An association has no responsibility, no duties, no functions, no usefulness except as these things are delegated to it by its members and afterwards supported and upheld. It is to the managements of its member companies that a utility association must look for not only inspiration, but for its very existence. Without useful accomplishment an association cannot long exist, and without the interest of company executives no accomplishment is possible, for upon this rests the enthusiasm, the initiative, and the labor of the rank and file who do the work.

The splendid accomplishments of the Pacific Coast Gas Association during its thirty-four years of life must be credited to the executives who made them possible. They inspired the work, they used and proved the results, they made the decisions. The achievements of the future can come only from and through them. The rank and file can propose but cannot dispose; it can start but cannot finish; it can talk but cannot decide.

The Pacific Coast gas industry has many problems which can be best solved by united thought. It needs a co-operative technical research program; better, very much better, public relations; a definite, workable sales policy; dealer co-operation that really profits the dealer; more and better advertising. It needs to know more about itself and the people it is dedicated to serve; statistics; uniform cost data; the compilation of classified sales trends and a study of their causes. It needs the adoption of a means to help out our overworked public service commissions; it needs wider markets and a broader viewpoint.

The individual study of such general things leads to uncertain experiment and costly mistakes. The Association is of the gas industry and for the gas industry; it has the machinery, but too often lacks that breath of life which comes only from the executives' command "Go Ahead!"

Spokane Conference Plans Now Being Laid

J. L. Stone, vice-president and general manager of the Spokane Gas and Fuel Company, is now engaged in perfecting plans for the entertainment of all delegates to the Northwest Regional Conference to be held in Spokane on May 6 and 7 with headquarters at the Hotel Davenport.

There will be two sessions, one on the afternoon of Friday, May 6, and the other on Saturday morning, May 7. A get-together dinner will be served with entertainment trimmings on Friday evening. The program for the business sessions is now in course of preparation and will be mailed to all Association members sometime during April.

Dealers Committee

C. M. Grow, Chairman of the Commercial Section, has appointed Frank Packer of the Welsbach Company, chairman of the Dealers' Committee. Mr. Packer reports his committee as follows:

H. L. Spencer, Los Angeles.
Eugene Blackmen, Long Beach.
Fred Forrest, Los Angeles.
Allen T. Fesler, Santa Maria.
Geo. W. Smith, Santa Barbara.
J. A. Hill, San Francisco.
Frank C. Parker, San Francisco, Chairman.

It is the intention of this committee to make a survey of existing dealers' practices in selling to recommend improved methods. In addition they will make recommendations as to makes, models and capacities of ranges, water heaters, furnaces and space heaters. They will also endeavor to encourage co-operation with the Blue Star plan of the American Gas Association.

Transcript of February P. C. G. A. Sessions

Following is published a summary of the reporter's transcript of proceedings at the sectional meeting of the Pacific Coast Gas Association, held in Los Angeles, February 24.

COMMERCIAL SECTION

C. M. Grow, *Chairman*
Southern California Gas Company

C. M. Grow *(Los Angeles):* The Commercial Section is this year devoting its attention to the development of increased domestic sales, plans for better and more advertising, and the preparation of helpful data on industrial utilization of gas.

W. M. Henderson in his three-minute speech at the last Convention suggested that we take advantage of every opportunity to modernize the gas business. I know of no more practical methods than by home service, refrigeration by heat, advertising, and the application of surface combustion principles to the use of gas in industry.

REPORTS OF COMMITTEES

Domestic Sales—W. H. Mixter, Chairman *(San Francisco).* Report made by R. W. Campbell *(Los Angeles),* a member of the committee. The committee is preparing the following studies:

(1) An investigation of the trend of average domestic consumption per customer over a period of years.

(2) An investigation of consumer accounts to determine the relative load building merits of various types of appliances.

(3) A study of the cost of selling various types of appliances and reducing these figures into terms of load building cost.

(4) Survey of appliances in use, indicating degree of saturation and potential market.

The method and terminology have been outlined and the collection of data is under way.

Advertising—H. E. Davidson, Chairman *(Glendale):*

The committee is making a study of the possibilities of group advertising and will report on this subject at the Convention.

In addition we have given consideration to Wasteful Advertising, a subject brought before our last Convention by D. L. Scott in his paper "The Genus Blah". The gas industry on the Pacific Coast is faced today with keen and

aggressive competition, to meet which we must apply our efforts in the most effective way possible. It is of the utmost importance that we make all our advertising efforts productive—that we secure the greatest possible returns for the money spent. We advertise to secure a definite result, whether it be the furthering of good will, the sale of gas, the sale of stock or of better appliances, and any form of advertising which does not accomplish this end should be eliminated.

Advertising may be rendered ineffectual through the use of unsuitable or poorly prepared copy and by the use of improper media. Elimination of futile copy is easier of accomplishment than the ruling out of unsuitable media. Special edition, program and complimentary advertising of all sorts is of most questionable value, yet every utility advertising manager is subjected to considerable pressure in its behalf. All proposed advertising should be judged only by the probability of adequate returns. Let us eliminate all this waste and make our advertising money accomplish the utmost in meeting competition and in building up our industry.

Industrial Sales and Data Sheets—Lee Holtz, Chairman *(Los Angeles):*

Our study is segregated into four distinct groups as follows:

(1) Industrial Sales.

(2) Competitive fuels (other than electricity).

(3) Utilization (Gas burners and furnaces; heat treatment of steel; ceramics; storage hot water systems).

(4) Industrial data sheets and forms.

The committee presented two preliminary studies, one by Edgar M. DeRemer (Los Angeles) on Data Sheets, and the other by Willard F. Suess (Redondo Beach) on Industrial Sales. These will appear in an early issue of *Western Gas.*

Heat Conservation—H. L. Warren, Chairman *(Los Angeles):*

The committee is studying the insulation of walls, and the effect of weather stripping. We are determining constants for heat conduction through walls of standard construction on the Pacific Coast. The work will be done in collaboration with manufacturers and the report will contain curves and tables showing the value of insulation and its cost. Dozier Finley of the Paraffine Companies, a member of the committee, is planning to build a test house of two rooms, one insulated and the other not. Each room will be gas heated and the house will be revolved on a turntable so that neither room will be favored.

Home Service—J. C. Gilbert, Chairman *(Santa Monica):*

The committee hopes to produce a practical report which will convince gas company executives that there is real value in a Home Service Department. To this end it has enlisted the aid of the women who are making daily contact with our customers.

In its Convention report the committee will present statistics which will show the very small cost of the consumer contact made through Home Service and its value to public relations and sales.

As a part of the Committee's report a paper entitled "Have You Met Miss Home Service?" was read by Miss Ella M. Lehr (San Jose). This paper appeared in the March *Western Gas.* A summary of the discussion created by Miss Lehr's paper is as follows:

J. C. GILBERT *(Santa Monica):* The Southern Counties Gas Company is trying out Home Service in its Santa Monica district. Miss Isobel Allobach is in charge of the work and is in contact with our customers through the Parent Teachers Association, through the schools and churches, and through the Aid Societies. She conducts a weekly cooking school which, though not advertised, averages an attendance of about thirty-five. She makes from 200 to 250 calls a month following up appliance sales and gas range cooking troubles.

F. H. BIVENS *(Los Angeles):* I regret that more gas company executives could not have heard Miss Lehr's paper. our home service department has accomplished wonderful results not only in increased sales but in public relations. Miss Allobach is called upon to propose menus and to decorate tables. That is not gas business but it is the finest kind of domestic relations. It is advertising which cannot be bought.

Our domestic load is a thing we should look to. An analysis shows that it has decreased $2.00 per customer per year during the last three years. There is no better way to correct this than through Home Service. We are so thoroughly sold on it that we will extend it to our other seven districts as soon as we find the proper persons to handle it.

MORRIS F. WALES *(San Francisco):* The Coast Counties Gas & Electric Company has contemplated the establishment of a Home Service Department for over a year, but has not yet found the proper person to take care of it. We are handicapped by not selling gas appliances.

GAS REFRIGERATION

Mr. Grow then introduced H. C. Parker of the Parker Ice Machine Company of San Bernardino.

H. C. PARKER *(San Bernardino):* Our company manufactures commercial ice machines and is not interested in household refrigeration except as called in in a consulting capacity. At the time electric household refrigeration was brought out we decided to stay out of it and I believe we were wise. The free service necessary with the electric machines has put dozens of dealers out of business.

Mr. Parker then went on to describe the Electrolux Servel gas-fired refrigerator which he had investigated thoroughly for the Southern California Gas Company. He spoke of its simplicity, the absence of necessity for service, its possible developmnt for ice water, ice cream cabinets, combination refrigeration and cooking units for apartments and its capacity limitations for commercial use. The present Electrolux Servel box has a capacity of 74 pounds of ice a day whereas an ordinary meat market requires a two ton plant and in this size the compression type is much more compact and somewhat cheaper than an absorption machine could be.

TECHNICAL SECTION

R. M. McCALLEY, *Chairman*
Portland Gas & Coke Co.

W. M. Henderson *(Los Angeles)* presided at the meeting and read a telegram from Mr. McCalley stating that heavy rains had so paralyzed the railroads that it would be impossible for him to arrive in time. Mr. Henderson then outlined the procedure to be followed and called for committee reports.

Refractories—H. J. Knollman *(Los Angeles),* Chairman.

Mr. Knollman reported that the service of straight natural gas started in Los Angeles in February had upset the committee's plans as the closing down of the local gas plants had stopped the research work. Work contemplated had included a study of the grade of brick necessary in generator fireboxes, insulation of generators, tests of high temperature cements, and a continuation of the study of the influence of the number and size of checker brick on gas manufacture.

In answering a question by M. E. Waite *(San Diego),* Mr. Knollman said that high temperature cements are made of highly refractory clay material burned in high temperature kilns, ground, and mixed with a small proportion of the raw clay. It has air setting characteristics which reduce shrinkage to such an extent that thinner joints can be used and still leave no chance for the joints opening up. It is of great aid in securing proper insulation.

W. S. YARD *(San Francisco)* spoke of a problem encountered by the Pacific Gas and Electric Company in which the refractories had been thought at fault. It was found, however, that the oil used in the plants where the trouble occurred contained an appreciable percentage of

(Continued on Page 62)

EDITORIAL

That Domestic Load

WHILE gas sales in the main are on the increase there is considerable cause for thought in the fact that many a gas utility is showing decreasing sales per domestic consumer. Cooking loads unquestionably are slipping slightly, for one reason or another—changing home habits, competitive fuels. An article in this issue tells of the experiences of an energetic Middle West utility in fighting to retain its cooking load. We cannot watch this load diminish without a protest. The utility in question is wisely looking years into the future and laying its lines of defense, to retain the cooking load.

Not only in the field of cooking does the domestic gas situation concerns us. Why is it that electricity has gotten the inroad into minor heating uses in the home that it now enjoys? We know that heating can be done better with gas. We have the means at hand to prove it; there is a gas appliance for every small home use that the electric industry has made an appliance to serve. We have our toasters, our waffle irons, our doughnut cookers, our aluminum kitchen devices, our refrigerators. We have a counterpart for every one of the electric appliances, the thousand and one small appliances that ought to be doing their bit in building up the individual gas demand beyond that created by the gas range, water heater and space heater.

The seat of our difficulty is that the public does not know our wares. For some reason or other the corner drug store is not showing the latest model in small gas home fitments, though it has a full line of the electric. There have been no mammoth manufacturing groups to take the initiative, selling the public on doing it the gas way. Gas companies must awaken to the fact that it is their plain course of salvation to do this popularizing for themselves. If changing national habits are lessening gas consumption per home, the gas company had better do some habit-changing. Telling the public that it is possible to do its home tasks simply, conveniently, modernly, the gas way—that is the answer. This means advertising, of course. And it means sales advertising, as contrasted with that other essential, good will advertising. The merchandising gas company which does not tie its advertising up to its appliance sales effort has overlooked one of the first essentials of effective selling.

Certain it is that the gas industry cannot rest the future of its domestic load on the fact that it is traditional to use gas in the home. Traditions vanish overnight nowadays. Take a lesson from what happened to long hair.

Advertising alone will not hold—will not build up—this domestic load. But it will let the public know what we have to sell, and it will open doors for the gas appliance salesman, be he representative of company or of dealer.

Progress In a Related Industry

THE gas industry may fairly claim the natural gasoline industry as a member of its family. Natural gasoline companies perform an essential function in preparing the natural gas product for our eventual consumer, at the same time conserving a natural resource.

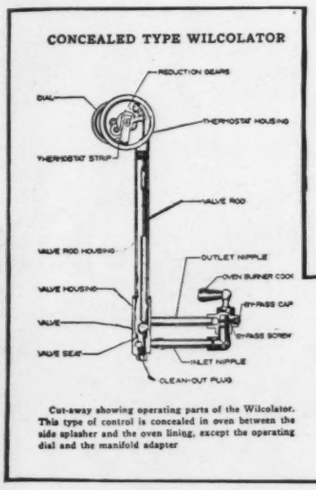
Western Gas this month devotes a number of pages to several phases of natural gasoline in the West. It will be appreciated that this young industry is alert to improve. In the past decade natural gasoline practice has had a complete turn over, which has meant the shelving of first methods and introduction of many important refinements in operation. Natural gasoline may be the youngest, but it is not the least enterprising member of the gas family.

First Steps in Refrigeration

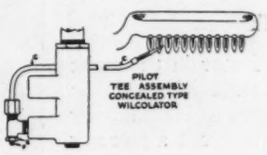
A FEW months from now it probably will not be worthy of particular comment that a carload lot of gas-fired refrigerators has been unloaded at a Western siding, with the refrigerators started toward their ultimate destination, out on the gas line, building up the domestic load factor. But just now it is news, and good news. Late in March a Pacific Coast gas company got its first shipment of refrigerators, with another car load due in two weeks. These are understood to be the first large-lot shipments to reach the West Coast.

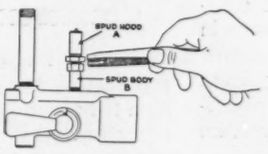
Western Gas wants to keep in touch with the experiences of our Western utilities in introducing refrigeration. Help us to pass around all the available practical information resulting from first attempts at grasping the new load. It would be unfortunate if every gas company had to learn by the trial and error method.

Installation *and* Adjustment *of the* Oven Heat Control



Cut-away showing operating parts of the Wilcolator. This type of control is concealed in oven between the side splasher and the oven lining, except the operating dial and the manifold adapter





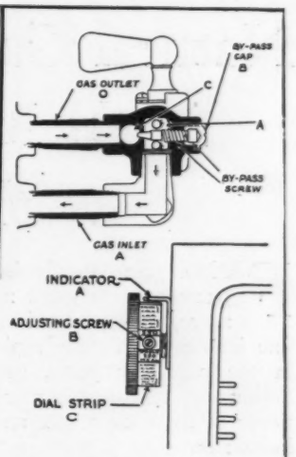


Fig. 1 *Fig. 2* *Fig. 3* *Fig. 4, top—Fig. 5, bottom*

By HARRY R. MAYER
Tappan Stove Company

¶ In the following article Mr. Mayer reviews for WESTERN GAS' readers the chief points discussed in his lecture before the Gas Appliance Association's sales school. For several months WESTERN GAS has been publishing the valuable material on gas and gas appliances which was produced during the Association's school.

ONLY a comparatively few years ago oven heat controls made their first appearance on gas ranges. At that time their practical advantages were doubted because it was believed by many that they would not continue to function properly without constant servicing. Housewives, however, needed such a device on their ranges to accurately measure and maintain baking temperatures.

Without the heat control on the range the user found it necessary to constantly be at hand when baking was being done, to carefully watch her oven so that the food would not burn or be undercooked.

Today oven heat controls are acknowledged to be a complete success. They require minimum servicing. No longer is it necessary to be in the kitchen to carefully watch the baking process. The heat control accurately maintains any given temperature required in the oven, regardless of the kind of gas, B. t. u. content or varying gas pressures.

CONTROLS WIDELY USED

Practically all manufacturers of gas ranges furnish ranges equipped with the oven heat controls. Some manufacture their own controls and others buy them already assembled from thermostat manufacturers. Several of the various controls have been approved by the A. G. A. Laboratory, and can be depended upon to give satisfactory service to the consumer.

The Wilcolator oven heat control is to be explained in this article. The Wilcolator is called a unit control for the reason that it is furnished to stove manufacturers as a complete unit ready to install on the range. The instrument is calibrated at the factory and after it is installed on the range it is again checked before the range is crated.

The Wilcolator makes use of a piece of thermostatic metal as its operating element. This metal has a constant co-efficient of expansion for every change of one degree of temperature and will accurately control temperature up to 900° or more indefinitely.

The concealed type regulator when installed on a range is concealed with the exception of the operating dial. The valve rod housing and the thermostatic strip of metal and housing are placed in the cold air flue of the oven between the side splasher and the oven lining.

When operating this control the wheel is turned to the temperature desired. *(See Fig. 1.)* If the wheel is set at 550° the ball valve will be raised about ½ inch from the valve seat. Then when the oven is heated to the 550° the thermostatic metal movement will be sufficient to allow the ball valve to lower onto its valve seat, thereby stopping the flow of gas through the control to the oven burner.

It is not desirable to have the oven burner go out completely when the valve closes; therefore, a small amount of gas is allowed to reach the oven burner through the by-pass which sends gas to the burner independent of the regulator control.

Only sufficient gas should be allowed through the by-pass to keep the burner from going out completely. If too much gas is sent through the by-pass it would increase the oven temperature after the control valve closed. A needle valve is used to adjust the by-pass flame and it is very important to make this adjustment at the time the range is installed. Two other adjustments must be made at the time the range is installed, as follows:

1. Pilot light flame should be about one inch long. *(See Fig. 2).* The tip of the flame should be about one-half inch away from the burner and not directly in full flame of oven burner, yet close enough so that it will not interfere with the broiler pan. The pilot flame should cross the oven flame, but should not impinge on the burner itself. If it does, it will deposit soot on the oven burner. To regulate pilot light, loosen lock nut and turn set screw to right to reduce the flame and left to increase the flame. The pilot light burns all the time the oven is being used.

2. The size of oven burner flame must be adjusted same as though no regulator were used. *(See Fig. 3).* Simply turn spud hood "A" to right to decrease flame and left to increase flame. Be sure the air shutter on the burner neck is adjusted to give proper proportion of air and gas.

It is not necessary to check the calibration of the Wilcolator when the range is installed. However, should the occasion require a check-up there are two methods—both satisfactory—the hot and the cold. The cold method is recommended because it takes only a couple of minutes.

CHECKING CALIBRATION

1. *Cold method*—must be done with cold oven. First remove by-pass cap nut and with screw driver turn by-pass adjusting screw to the right as far as it will go. *(See Fig. 4).* Then give it

(Continued on Page 56)

Natural Gasoline Practice *in the* Mid-Continent *and on the* West Coast Varies

By SPECIAL CORRESPONDENT

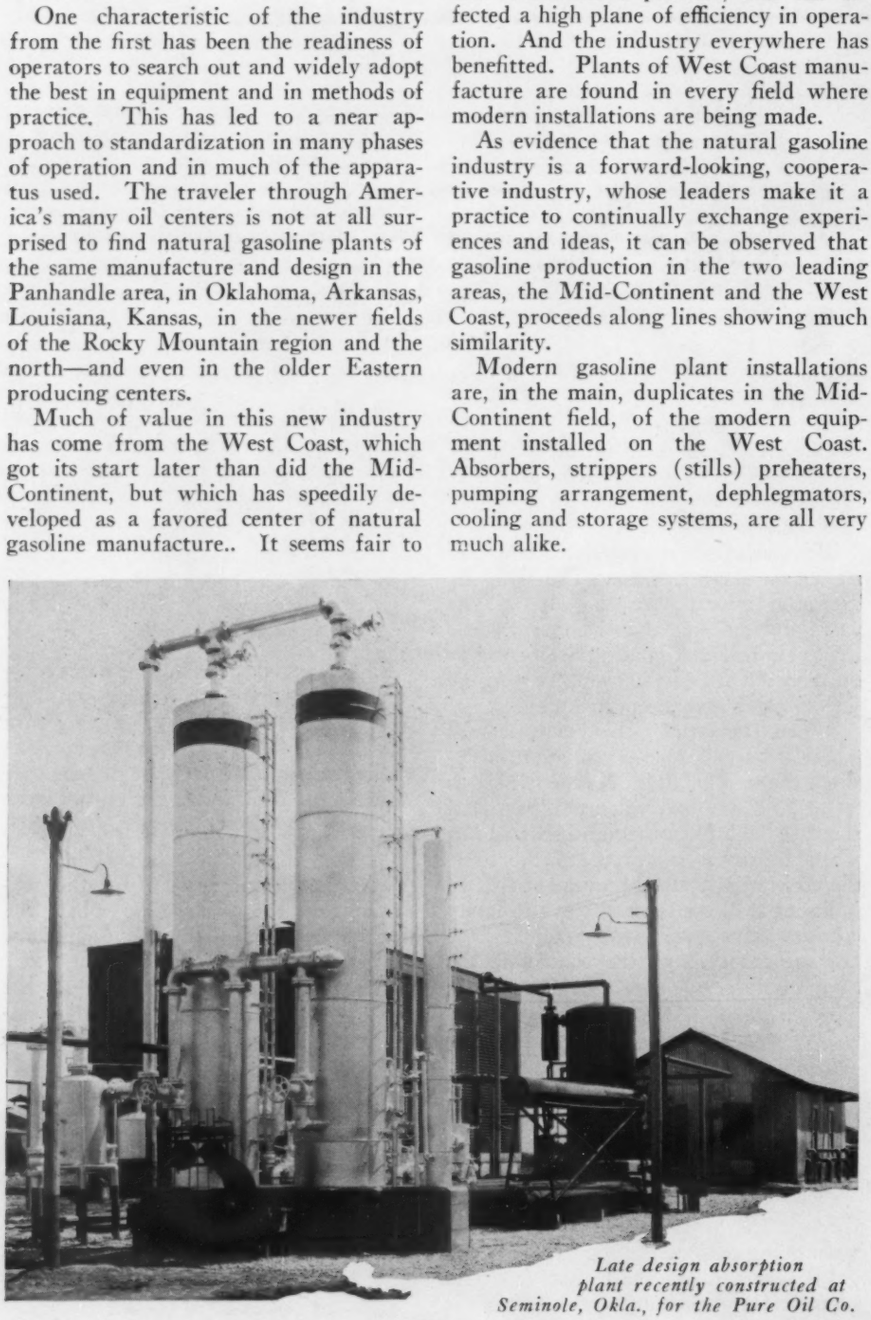
FROM the standpoint both of plant operation the natural gasoline industry has come rapidly forward in magnitude and of efficiency in the past few years, growing from nothing to its present place of prominence in the natural gas and petroleum industries.

One characteristic of the industry from the first has been the readiness of operators to search out and widely adopt the best in equipment and in methods of practice. This has led to a near approach to standardization in many phases of operation and in much of the apparatus used. The traveler through America's many oil centers is not at all surprised to find natural gasoline plants of the same manufacture and design in the Panhandle area, in Oklahoma, Arkansas, Louisiana, Kansas, in the newer fields of the Rocky Mountain region and the north—and even in the older Eastern producing centers.

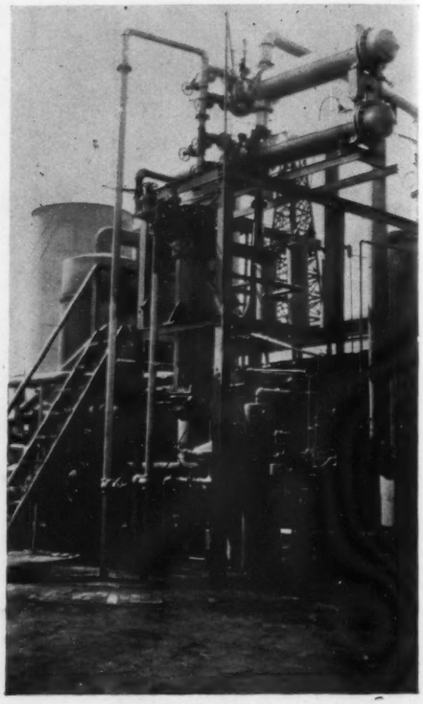
Much of value in this new industry has come from the West Coast, which got its start later than did the Mid-Continent, but which has speedily developed as a favored center of natural gasoline manufacture.. It seems fair to observe that a potent factor in the swift progress of the California industry has been the general exchange of ideas among operators, which has produced a more or less standardized practice, and has effected a high plane of efficiency in operation. And the industry everywhere has benefitted. Plants of West Coast manufacture are found in every field where modern installations are being made.

As evidence that the natural gasoline industry is a forward-looking, cooperative industry, whose leaders make it a practice to continually exchange experiences and ideas, it can be observed that gasoline production in the two leading areas, the Mid-Continent and the West Coast, proceeds along lines showing much similarity.

Modern gasoline plant installations are, in the main, duplicates in the Mid-Continent field, of the modern equipment installed on the West Coast. Absorbers, strippers (stills) preheaters, pumping arrangement, dephlegmators, cooling and storage systems, are all very much alike.



Late design absorption plant recently constructed at Seminole, Okla., for the Pure Oil Co.



Showing compact arrangement of distillation, dephlegmation, and condensing equipment in the O. C. Fields Gasoline Corp. plant at Huntington Beach, Calif.

In some fields of operating practice, however, it is found that each section has developed its own procedure, due to differing gas conditions, market demands, or other factors producing variance in operation.

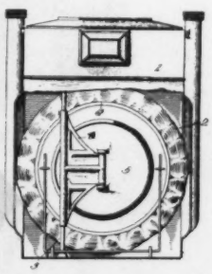
The Mid-Continent practice of gas testing, for example, is not employed to any appreciable extent on the West Coast. Mid-Continent operators have for years been perfecting compression type of gas testing apparatus. This consists of a powerful miniature compressor which is either belt-driven from the wheel of the carrying motor car, or is propelled by a connection from the driving shaft of the automobile. The gas is compressed and expanded through a water-cooled coil, and thus the gasoline content of the gas is removed in much the same manner as the compression type of gasoline plant removes it. Some of these test cars are elaborate miniature gasoline plants. They are mounted on automobile or light truck bodies, and are operated by an employee known to the trade as a Gas Tester. This type of analysis of natural gas is made prior to gas purchase, and rate of payment is based upon the findings of the Gas Tester. Plant operation is also often checked by the findings of the test car apparatus. Plant operators have made this a standardized practice throughout virtually the entire Mid-Continent area.

West Coast operators for the most

(Continued on Page 50)

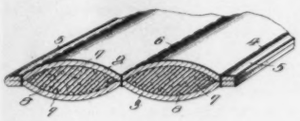
THIS MONTH'S PATENTS PERTAINING TO THE INDUSTRY

1,611,105 DIAPHRAGM FOR DRY-TYPE GAS METERS. EDMUND S. DICKEY, Baltimore, Md., assignor to American Meter Company Inc., New York, N. Y., a Corporation of Delaware. Filed Aug. 30, 1922 Serial No 585,265 17 Claims (Cl. 73—1.)



1. A diaphragm for dry type gas meters, having a bellows portion made of textile material, having its interstices filled and sealed with a preservative lubricant, or a mixture of materials forming a preservative lubricant.

1,611,106. METHOD OF MAKING BELLOWS MATERIAL FOR GAS-METER DIAPHRAGMS. EDMUND S. DICKEY, Baltimore, Md., assignor to American Meter Company, Inc., New York, N. Y., a Corporation of Delaware. Filed Aug. 30, 1922 Serial No 585,266. 19 Claims. (Cl 154—2.)



1. That process for forming and treating bellows material for dry type gas meter diaphragms and the like, which consists in providing a tubular member of flexible material, and impregnating said member from the inside thereof with a non-setting comminuated substance to completely fill and seal the pores or interstices of the material.

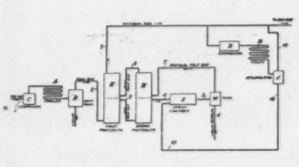
1,614,707 PROCESS OF MAKING ADSORBENT CARBON. OSCAR L. BARNEBEY, Columbus, and MERRITT B. CHENEY, deceased, late of Briggsdale, Ohio, by Josephine B. Cheney, administratrix, Briggsdale, Ohio. Filed Feb. 14, 1925. Serial No. 9,323. 14 Claims. (Cl. 252—3.)

1. In a process of making adsorbent carbon, heating at carbon activating temperatures carbonaceous material and steam and generating therefrom gaseous reaction products of higher CO_2 content than CO content

1,597,964. METHOD OF REMOVING SULPHURETED HYDROGEN FROM GASES. WILHELM GLUUD, Dortmund, Germany. Filed Sept 11, 1922. Serial No. 587,581, and in Germany Sept. 20, 1921 Renewed July 24, 1926. 12 Claims. (Cl. 23—225.)

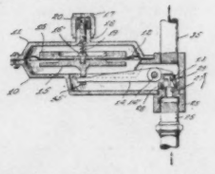
1. The process of removing sulphureted hydrogen from gases which consists in subjecting the gas to the action of a nickel-salt solution and treating the sulphide obtained thereby with a gas containing oxygen.

1,613,108. RECOVERING GASOLINE. FRED E. HOSMER, Fort Worth, Tex. Filed July 16, 1926. Serial No 122,927. 2 Claims. (Cl. 183—114.6.)



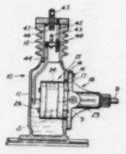
1. In the recovery of gasoline by the refrigeration of natural or casinghead gas the step which comprises contacting the vapors of gas to be cooled with a solution of a cooling medium cooled by cold gas subsequently obtained from the natural gas in a later stage of the operation.

1,598,449. GAS REGULATOR. ARTHUR L. PICKERING, Anderson, Ind.; Forrest M. Pickering, administrator of said Arthur L. Pickering, deceased, assignor to Economy Governor Company, Anderson, Ind., a Corporation of Indiana. Filed May 2, 1924. Serial No. 710,684. 7 Claims. (Cl. 50—26.)



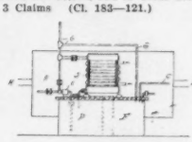
7. In a gas regulator having a cast metal casing, a pressure-responsive element, a valve; a lever for operatively connecting said valve and said pressure-responsive element, said lever having a laterally projecting trunnion which is pivotally supported in said casing in a recess formed in said casing by said trunnion during the casting of said casing.

1,610,503. GAS COMPRESSOR SILAS W. C. FITTS, Alameda, Calif., assignor, by mesne assignments, to Standard Heating & Refrigerating Company of California, San Francisco, Calif. a Corporation of California. Filed Jan. 5, 1926. Serial No. 79,503 4 Claims. (Cl 230—30.)



1 In a gas compressor a housing having therein a compressor unit comprising a casing which extends through one wall of the housing and is detachably mounted therein and provided with a gas-intake passage leading from the outside of the housing and with a gas-outlet passage through its top, and a compressor element rotatably mounted in the casing, the casing provided with a capillary bore in its bottom, and the housing being adapted to hold a liquid lubricant therein to a level below the top of the casing and having an extension above the casing a disk removably mounted and slidably adjustable in the extension, a tube extending through the disk and having a downward turned end above the disk and spaced therefrom, another tube extending downward through the disk and between the casing and a wall of the housing, and a gas-outlet pipe leading from the extension above the disk

1,614,347 MANUFACTURE OF FUEL GASES. CHARLES COOPER and DANIEL MAYON HENSHAW, Huddersfield, England, assignors to W. C. Holmes and Company, Limited, Huddersfield, England. Filed Jan. 30, 1926, Serial No 85,044, and in Great Britain Dec. 11, 1924 3 Claims (Cl. 183—121.)

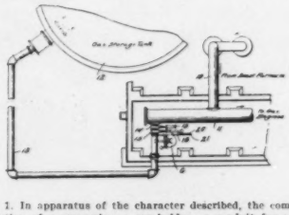


1. A process of treating fuel gases which comprises bringing a continuous stream of fuel gases at a pressure at which they are to be distributed and a temperature not materially below atmospheric temperature, in contact with a body of water absorbing material in a liquid state and withdrawing the substantially dehydrated fuel gases

1,614,303. PROCESS OF PRODUCING CORROSION-RESISTING COATING ON IRON AND STEEL AND PRODUCTS THEREOF CHAD H HUMPHRIES, Indianapolis, Ind., assignor to Metals Protection Corporation, Indianapolis, Ind., a Corporation of Indiana. Original application filed June 5, 1924, Serial No. 718,080. Divided and this application filed Nov. 22, 1926. Serial No. 150,138 6 Claims. (Cl. 204—13.)

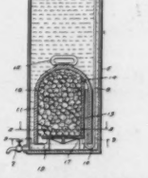
1. Process of protecting iron and steel articles against corrosion which comprises applying to the surfaces thereof successive coatings of a metal which is electropositive to iron, a metal which is electronegative to said first named coating metal, and finally a coating of chromium.

1,597,867 MECHANISM FOR CONTROLLING GAS PRESSURES. JOHN PAYNE POWELL, Sparrows Point, Md., assignor to Bethlehem Steel Company, Bethlehem, Pa., a Corporation of Pennsylvania. Filed Sept. 22, 1921 Serial No. 502,362 10 Claims. (Cl. 48—191.)



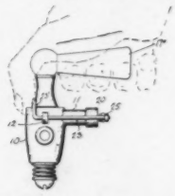
1. In apparatus of the character described, the combination of a gas main; a gas holder; a conduit for connecting the holder to the main; a valve in the conduit; motor means for opening and closing the valve; and controlling mechanism for the motor means including means responsive to a decline in gas pressure in the main to render the motor means effective to open the valve and responsive to an increase in holder and main pressure to render the motor means effective to close the valve.

1,598,108. GAS GENERATOR. BURTON B. ANNIS, Columbus, Ohio. Filed July 18, 1925. Serial No. 44,553. 3 Claims. (Cl. 23—282.)



3. In a gas generator, a liquid container, a bell-shaped charge holder supported therein near the bottom, means for supporting a charge in the charge holder, a pipe extending vertically in the liquid container and having a gooseneck portion projecting upwardly into the charge holder for receiving gas from a location near the top of the charge holder.

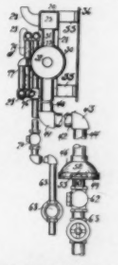
1,599,894. LOCKING DEVICE FOR THE GAS COCKS OF STOVES, RANGES, AND HEATERS. EDMUND JACH, Milwaukee, Wis. Filed Apr. 30, 1926 Serial No. 105,758. 2 Claims. (Cl 251—164.)



1 A safety cock for gas stoves, etc., comprising a barrel and a tubular extension therefrom, a valve arranged for partial rotation in the barrel to control the flow of gas, a spring-pressed pin arranged in the tubular extension and engaging a bore in the valve, such pin acting to prevent rotation of the valve, and a push bar connected at one end to the projecting end of the said pin and serving to withdraw the engaging end thereof from the bore in the valve, and operated by the thumb to permit the valve to be turned

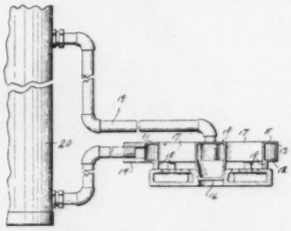
1,609,483. GAS BURNER PETER MACMILLAN and EDWARD NORRING, Brooklyn, N. Y. Filed Feb. 9, 1924 Serial No. 691,703. 2 Claims. (Cl. 158—13.)

2. In a burner the combination of a U-shaped housing with a longitudinal member and members at right angles thereto, said housing having chambers and fuel outlets, a mixing chamber between the members of the housing, conduits connecting the mixing chamber and the chambers of the housing, piping for gas connected to the mixing chamber, an air chamber for the inflow of air connected to said piping, a damper in the air chamber to control the inflow of air to the air chamber and to said mixing chamber, a pipe grid over the housing adjacent to the fuel outlets thereof, piping connecting said grid and



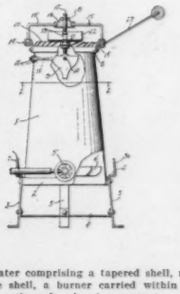
mixing chamber, piping for water connected to said pipe grid and flame mouth pieces extending from the housing and connected to the chambers thereof.

1,612,900. WATER HEATER FOR GAS BURNERS. CLARENCE J. ALDRIDGE, Seattle, Wash. Filed Feb. 4, 1926. Serial No. 86,009. 2 Claims. (Cl. 126—53.)



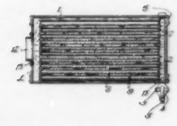
1. A water heater comprising a hollow circular body containing water having upper and lower walls and an outer peripheral wall, the outer wall having an inlet and an outlet, and said upper and lower walls having registering openings, the openings having walls entirely surrounding the same and extending between the upper and lower wall to thereby provide spaces through which gas flames may pass from a gas burner upon which the water heater is disposed, the center of the body being formed to provide a member adapted to rest upon and engage with the center of a gas burner, and the lower wall of the body having downwardly extending feet adjacent the circumference of the body to rest upon the gas burner.

1,610,332. GAS HEATER. ALLAN A. SMITH, Chicago, Ill. Filed Apr. 11, 1925. Serial No. 22,387 2 Claims. (Cl. 126—85.)



1. A gas heater comprising a tapered shell, means for supporting the shell, a burner carried within the shell near the bottom thereof, a bearing support near the top of the shell, a frame carried by the shell, a vertical shaft journaled between said frame and said bearing support, a horizontally disposed propeller carried by said shaft, and vanes carried by said shaft above said propeller for driving heated air in a direction at right angles to the shaft.

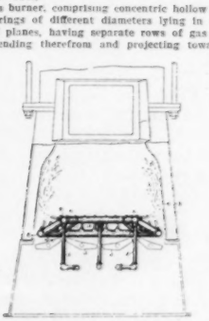
1,610,890. HEATER. JOSEPH DAVID SCHMIDT, Berkeley, Calif. Filed Feb. 8, 1923. Serial No. 617,871. 3 Claims. (Cl. 126—90.)



1. In a heater of the character described, a rectangular container having a burner arranged along the lower front edge thereof, a flue in the rear wall and parallel partitions arranged longitudinally of the container and stopping short of the front and rear walls thereof to form flat chambers adjacent the said front and rear walls, alternate sets of adjacent partitions being joined at the front and rear ends and the other sets being joined at the top and bottom to cause flat columns of air to rise between similar flat columns of heated gases traveling from the front to the rear.

1,613,611 GAS BURNER. HARRY E. KERR, Cleveland, Ohio, assignor to The Cleveland Gas Burner & Appliance Company, Cleveland, Ohio, a Corporation of Ohio Filed Sept. 9, 1926. Serial No. 134,390. 8 Claims (Cl. 158—106.)

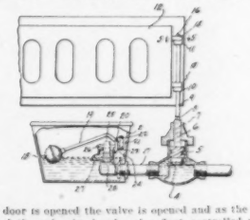
1. A gas burner, comprising concentric hollow gas distributing rings of different diameters lying in different horizontal planes, having separate rows of gas delivery tubes extending therefrom and projecting toward each



other in pairs to deliver separate streams of combustible mixtures into confluence with oblique deflecting effect relatively to the said horizontal planes.

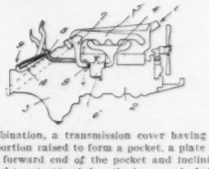
1,614,478. AUTOMATIC AIR MOISTENER FOR HOT-AIR FURNACES KERN WILLIAM LARKIN, Detroit Mich. Filed Dec 19, 1925. Serial No. 76,551. 4 Claims. (Cl. 126—113.)

1. An automatic air moistener for hot air furnaces comprising a water pan open to the hot air chamber of the furnace, a pipe for supplying water to the pan, a valve in the said pipe, the valve having a stem provided with a squared recess, a rod having a squared end fitting in the said recess, the rod being secured to the furnace fire door and forming a pivot for the said door, whereby,



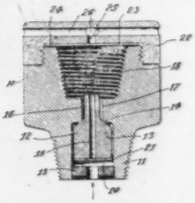
as the door is opened the valve is opened and as the door is closed the valve is closed and a float controlled valve on the end of the said pipe within the water pan

1,612,141. GAS SAVER JOHN MATTES and WALTER PETCKE, Dakota City, Nebr. Filed Mar. 10, 1925 Serial No. 14,541. 1 Claim. (Cl. 123—119.)



In combination, a transmission cover having its intermediate portion raised to form a pocket, a plate extending from the forward end of the pocket and inclining downwardly and terminating below the lower end of the pocket, walls rising from the sides of the plate and fixed to the cover, a pipe extending from the upper end of the pocket in the cover.

1,606,831. PLUG FOR GAS CONTAINERS. CHARLES T. FORD, Washington, D. C., assignor to Adolph Mueller, trustee, Decatur, Ill. Filed Jan. 23, 1922. Serial No. 531,265 15 Claims. (Cl. 220—89.)



1. A safety plug for sealing containers, comprising, in combination, a member adapted to engage an opening in a container and having a passage therethrough, a valve in said passage normally closed by pressure in said container and having an aperture therethrough, and destructible means closing said valve aperture.

P. C. G. A. TO HOLD JOINT MEET WITH ARIZ. UTILITIES ASSN.

THE joint meeting of the Pacific Coast Gas Association and the Arizona Utilities Association, which bids fair to become an annual event, will be held in Flagstaff, Arizona, on Thursday and Friday, May 26 and 27. Headquarters will be at the Monta Vista, a brand new hotel. Those from California who attended the meeting at Tucson last year will be most enthusiastic about the Flagstaff meeting for at Tucson they learned that the Arizona utility men know how to work hard, play hard, and are past masters in the art of entertaining.

Flagstaff is in the center of some of the most marvelous scenery in the country. A few hours drive brings one to the extinct volcanoes, lava beds, ice caves, cliff dwellings, San Francisco Peaks, Mormon Lake, Montezuma's Well, etc. A three days trip is planned to Lee's Ferry and to the Glen Canyon dam site on the Colorado River which is now in the national lime-light.

George T. Herrington, general manager of the Flagstaff Electric Light Company, is chairman of the entertainment committee; Claude S. Webber, superintendent of the Tuscon Gas Electric Light and Power Company, is chairman of the program committee; W. C. Hornberger, assistant general manager of the Central Arizona Light and Power Company is chairman of the attendance committee, while Ben Ferguson, secretary of the Arizona Utilities Association, is chairman of the finance committee.

It is expected that the attendance at the meeting will include public utility men from Arizona, Colorado, New Mexico, and California. Those who intend to go as representatives of the Pacific Coast Gas Association should notify Mr. Hornberger immediately.

OKLAHOMA UTILITIES ASSN. HAS RECORD CONVENTION

A CONVENTION registration of 825, as against 793 last year, shattered all attendance records for meetings of the Oklahoma Utilities Association when that organization met for its three-day session at Oklahoma City, March 8, 9, and 10.

The gas branch of the Association's activities came in for a good measure of attention in the meetings. H. O. Caster, New York, a member of the executive committee of H. L. Doherty & Co., spoke in the general sessions on "Natural Gas and the Public," and there were a number of able papers presented in the meetings of the gas section of the Association. A list of speakers and their topics follows:

"The Conservation School," Logan Cary, Oklahoma City, Gas Superintendent, Oklahoma Gas & Electric Company.

"Gas Company Public Relations," C. W. Robins, Ponca City, Okla., General Superintendent, Gas Division, Oklahoma Northern Utilities Company."

"The General Construction and Operations of Compressor Stations and Their Relations to the General Operation of the Pipeline System," F. D. Renfro, Bartlesville, Okla., The Empire Companies.

"Co-operation as a Factor in Conservation," W. J. Armstrong, Oklahoma City, Chief Conservation Officer, Corporation Commission of Oklahoma.

"Corrosion of Pipe Lines," R. W. Hendee, Tulsa, Okla., General Field Superintendent, Oklahoma Natural Gas Corporation.

"Scenic House Heating," J. W. Duvall, Oklahoma City, Oklahoma Gas & Electric Company.

"Open Flow Measurement," E. L. Rawlins, Bartlesville, Okla., United States Bureau of Mines.

"Meter School," J. H. Baxter, Oklahoma City, Gas Engineer, Oklahoma Gas & Electric Co.

"Relation of Petroleum Engineering to Gas Industry," Dr. H. C. George, Director, School of Petroleum Engineering, University of Oklahoma.

"Incineration," A. A. Naulin, Milwaukee, President, Home Incinerator Company.

"Distribution System Leakage," John Crout, Kansas City, The Gas Service Company.

Election of Association officers for the new year resulted in the choice of E. R. Ernsberger, Oklahoma City, president; L. W. Scherer, Yale, first vice-president; H. L. Montgomery, Bartlesville, second vice-president; W. R. Emerson, Oklahoma City, treasurer; E. F. McKay of Oklahoma City was re-elected as manager of the Association. H. L. Montgomery also represents the Gas Division on the Executive Board.

N. G. A. SO.-WEST DIVISION HAS EXCELLENT PROGRAM PREPARED

THE program of the meeting of the Southwest Division of The Natural Gas Association of America to be held in Dallas, April 12 and 13, is practically complete.

Subject to slight changes, the program is as follows:

Address of Welcome—J. W. Everman, supervisor of utilities, City of Dallas.

Response to Address of Welcome—E. R. Brown, president Magnolia Petroleum Company.

Remarks by Chairman—N. C. McGowen, The Palmer Corporation, Shreveport, La.

Paper: The Trend of Gas Measurement—E. R. Clark, Oklahoma Natural Gas Corporation, Tulsa.

Paper: Building the House Heating Load—Floyd M. Rosecrans, Gas Service Company, Kansas City,Mo.

Paper: Pipe Line Flow Formulae—E. L. Rawlins, United States Bureau of Mines.

Paper: Cleaning Gas in Transportation Lines—Walter Reid, consulting engineer, Dallas.

Question Discussions:

Cooperation with Regulatory Bodies—Led by B. P. Stockwell, Oklahoma Corporation Commission.

The Merchandising of Gas—Led by Chester May, Lone Star Gas Company, Dallas, Texas.

Pipeline Corrosion—Led by John Crout, Gas Service Company Kansas City, Mo.

Methods of Storing Natural Gasoline—Leader of discussion to be supplied.

Report of chairman of standing committees and discussion of activities of committees, led by the several chairmen.

AGITATE TO PROHIBIT TAKING GAS OUT OF STATE OF TEXAS

Centering in West Texas, a movement has developed to have the state legislature enact a law to prohibit the transporting of gas out of the state, according to late press reports. Such a measure is said to be favored by the West Texas Chamber of Commerce, the Board of City Development of Amarillo, and by several other cities of the state. Quantities of gas are now being brought into Texas from Louisiana and Oklahoma, and opponents of the movement to prohibit transporting gas out of Texas state that retaliatory measures would doubtless be enacted in these two states.

BIG LOAD "JUST AROUND THE CORNER" FOR GAS UTILITIES

A potential heating load of nearly fifty billion cubic feet of manufactured gas a year is waiting just around the corner for 76 gas companies, according to the American Gas Association. This available business, brounght to light by a survey of the territory served by these 76 companies, located in every part of the United States, includes the use of gas in industries and factories only, and does not take into consideration the newly-opened fields of gas for house heating, incineration and refrigeration.

EQUITABLE METER CHANGES NAME TO PITTSBURGH EQUITABLE

WITH its recent purchase of the assets of the Pittsburgh Meter Company the Equitable Meter and Manufacturing Company has recently changed its name to the Pittsburgh Equitable Meter Company. The two plants will be operated, and all products manufactured by both companies will be continued.

Both the Pittsburgh Meter Company and the Equitable Meter Company have been in existence for more than 30 years and during that time, both have been engaged in the manufacture of gas meters. The Equitable Meter Company had also become one of the largest manufacturers of gas regulators, while the Pittsburgh Meter Company had become one of the largest manufacturers of water meters.

The original Equitable Meter Company became the Equitable Meter and Manufacturing Company in November, 1925. During 1926, the volume of business was increased 47½ per cent over any previous year, and 1927 gives indications of further increases. The Pittsburgh Meter Company has shown steady increase in sales each year for the past ten years. The two companies together, will have sales of approximately five million dollars, more than half of which is with the gas industries.

The Pittsburgh Equitable Meter Company maintains warehouses in Pittsburgh, Columbia, South Carolina, Chicago, Kansas City, Tulsa, Dallas and Los Angeles. There are sales offices in all of these cities, and also in New York City. Complete lines of water, gas, oil and gasoline meters are carried in all warehouses. The high pressure and low pressure regulators are carried in the warehouses located in natural gas sections, and domestic regulators are carried in all warehouses.

$5,000,000 FOR NATURAL GAS IMPROVEMENTS IN OKLAHOMA

Natural gas improvements in Oklahoma, according to the Oklahoma Utilities Association, have involved a $5,000,000 expenditure since January 1, 1926.

STOCKHOLDERS SANCTION PLAN FOR SOUTHWESTERN EXPANSION

At its stockholders meeting held late in February the Southwestern Light & Power Company of Oklahoma secured permission to issue $100,000,000 in bonds over a period of several years, and also to increase preferred stock shares from 25,000 to 75,000, and common stock from 25,000 to 75,000 shares. The first bond issue will amount to $6,000,000 and is planned to cover immediate development plans.

WORK PROGRESSING FAST ON MAGNOLA'S LINE

Magnolia Gas Company has eight crews of welders at work along the line of its natural gas line from Latex Station in Northwest Texas to Dallas and Fort Worth. The line, which will serve industrials of the above cities and way points, will be 198 miles long and is of 14-, 16-, 18-inch welded pipe. The Magnolia transmits gas from North Louisiana and Northeast Texas to refineries at Beaumont, and when the Dallas-Fort Worth extension goes into operation about July 1 will be handling in the neighborhood of 105,000,000 cubic feet daily.

HOYT IN NEW YORK

William L. Hoyt, western representative for the American Gas Products Company, left the Coast early in March for a trip to New York headquarters of his company.

4.	P_1=57.5 lb. absolute, P_2 = 33.8 absolute. G=0.73. Q=2,630,000 cu. ft. / 24 hrs. Length of line 12,500 feet.	Size of pipe = 6″.
5.	P_1=57.5 lb. absolute. P_2=33.8 lb. absolute. Q=2,630,000 cu. ft. per 24 hrs. G=0.73. Size of pipe 6″.	Length of line 12,500 feet.

Solution of Above Problems

Problem No. 1

On the diagram find intersection of 6″ I. D. pipe and ordinate at 12,500′, then go parallel to slope lines and meet abscissa, which starts at Q=2,630,000 and offsets at G=0.73. At this intersection follow ordinate to top scale of diagram reading the value of P_1^2—P_1^2=2160. From table of squares 57.5 squared=3306. Deduct from this value 2160, leaving 1146 for P_2^2, or P_2=33.8 lb. absolute.

Problem No. 2

This problem is the same as No. 1, except that we know P_2, which is 33.8, or squared it is 1146. To this add P_1^2—P_2^2, which is 2160, giving a value of P_1^2 of 3306. P_1=57.5 lb. absolute.

Problem No. 3

P_1^2—P_2^2=3306—1146=2160. From intersection of lines corresponding to 12,500′ and 6″ pipe, follow slope lines to intersecting vertical line from top scale corresponding to P_1^2—P_2^2 of 2160, then follow horizontal line to specific gravity line=1.0 and offset along slope line to G=0.73, then horizontal to Q, which is 2,630,000 cu. ft. per 24 hrs.

Problem No. 4

Find P_1^2—P_2^2=2160 as in problem No. 3. Drop ordinate at P_1^2—P_2^2=2160. Erect ordinate at length of line=12,500. Follow horizontal from Q=2,630,000 to G=0.73, then parallel to specific gravity slope lines to heavy ordinate (G=1.), then horizontally intersecting ordinate dropped from P_1^2—P_2^2=2160. From this intersection parallel to slope lines and intersect ordinate erected at length of line=12,500, and read on left 6″ I. D. pipe as size required.

Problem No. 5

This problem is the same as problem No. 4, except 12,500′, the required length of line, is read at the ordinate passing through the intersection of the 6″ pipe abscissa and the line parallel to the slope lines.

Design of Pipe Line

A simple pipe line problem will be solved using a suggested form of tabulating the data and results. The gas, which has a specific gravity of 0.7, will be collected from seven wells. The pressure at each well will be assumed as atmospheric, and the vacuum at the compressor plant intake should be about 10″, or an absolute pressure of 10.7 lb.

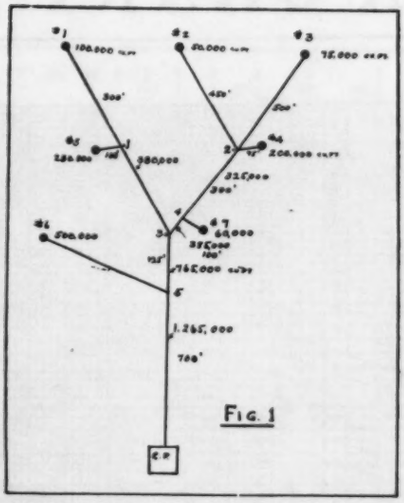


Fig. 1

To start with, the volume of gas at each well is marked on a drawing as shown on Fig. I. Also each well is marked with its number and every point where two or more lines join is given a number and the quantity of gas at that point is marked for convenience. The length of each line is also marked on the map. It should always be remembered that lines should be laid with as few pockets as possible. Always have them drain from the well to the main line with the flow of gas if possible. The problem solved is a hypothetical case, which will serve the purpose of illustrating the method.

A starting point will be selected. We shall choose well No. 1, with 14.7 pounds absolute pressure. Working down to point 1, the line is assumed to be 4″, but it is evident from P_1^2—P_2^2 that it is too large, so a 2″ line is then tried, which seems all right, since the pressure drop is 0.6 lb. The size of pipe from point 1 to well No. 5 is assumed. The size of line is then determined between points 1 and 3. The line is next computed from point 3 to 4. In this case P_1 and P_2 are reversed in Table 1, or P_1^2—P_2^2 is added to the value in column marked P_1, for the pressure is higher as one goes from point 3 toward well No. 3. The balance of the line above point 3 is then solved in the same manner. Go back to point 3 and solve for the size of line to the compressor plant. It works out that the pressure of the gas at the compressor plant intake is 10.5 lb, which is in accord with the 10″ vacuum set at the start.

In cases of wells near a line in which the pressure is very low, it is not wise to attempt to use up all the difference in pressure between the two points in order to have atmospheric pressure at the well. The pressure drop should be kept somewhat uniform throughout the system to allow for the fluctuating quantities of gas without undue back pressure at the well during flow heads. The same is true of wells near the compressor plants. It may be necessary to install vacuum regulators to prevent a vacuum being applied to the traps.

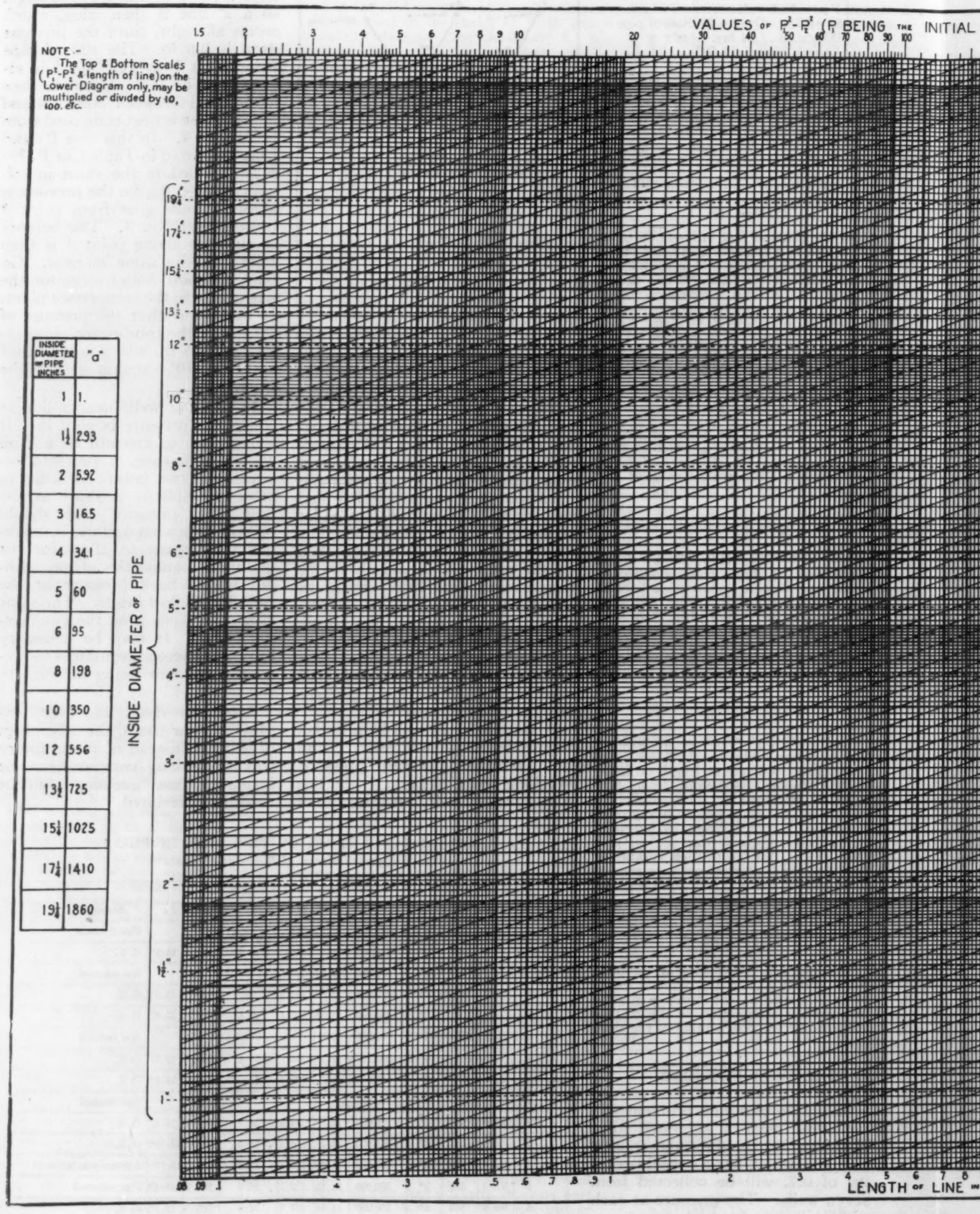
After the chart has been employed a few times, the advantage of using it instead of the ordinary way of making computations, or instead of just "guessing", will be readily appreciated.

TABLE I—SOLUTION OF PIPE LINE IN FIG. 1
Suggested Form of Tabulating Data

From	To	L	d	Q	P_1	P_1^2	P_1^2—P_2^2	P_2^2	P_2	Remarks
No. 1	1	300	4*	100,000	14.7	216	.59			Pipe too large
No. 1	1	300	2*	100,000	14.7	216	18.5	197.5	14.1*	O. K.
No. 5	1	100	2*	280,000	14.1					Size assumed
1	3	375	3*	380,000	14.1	197.5	47.	150.5	12.3*	O. K.
3	4	100	3*	385,000	12.3*	150.5	11.5	162.	12.7	O. K.
4	No. 7	60	2*	60,000	12.7					Size assumed
4	2	300	3*	325,000	12.7	162	24.5	186.5	13.7*	O. K.
2	No. 2	450	2*	50,000	13.7	186.5	11	197.5	14.1*	O. K.
2	No. 4	75	3*	200,000						Size assumed
2	No. 3	500	2*	75,000	13.7	186.5	22.7	209.2	14.5*	O. K.
3	5	125	4*	765,000	12.3	150.5	13.0	137.5	11.75*	O. K.
5	No. 6	500	4*	500,000	11.75	137.5	23.0	160.	12.7*	Appears pipe too large
5	No. 6	500	3*	500,000	11.75	137.5	99.0	236.5	15.4*	Pipe too small
5	No. 6	500	4*	500,000	11.75	137.5	23.0	160.	12.7*	O. K.
5	C. P.	700	6*	1,265,000	11.75	137.5	26.0	111.5	10.5*	O. K.

*Values solved for.

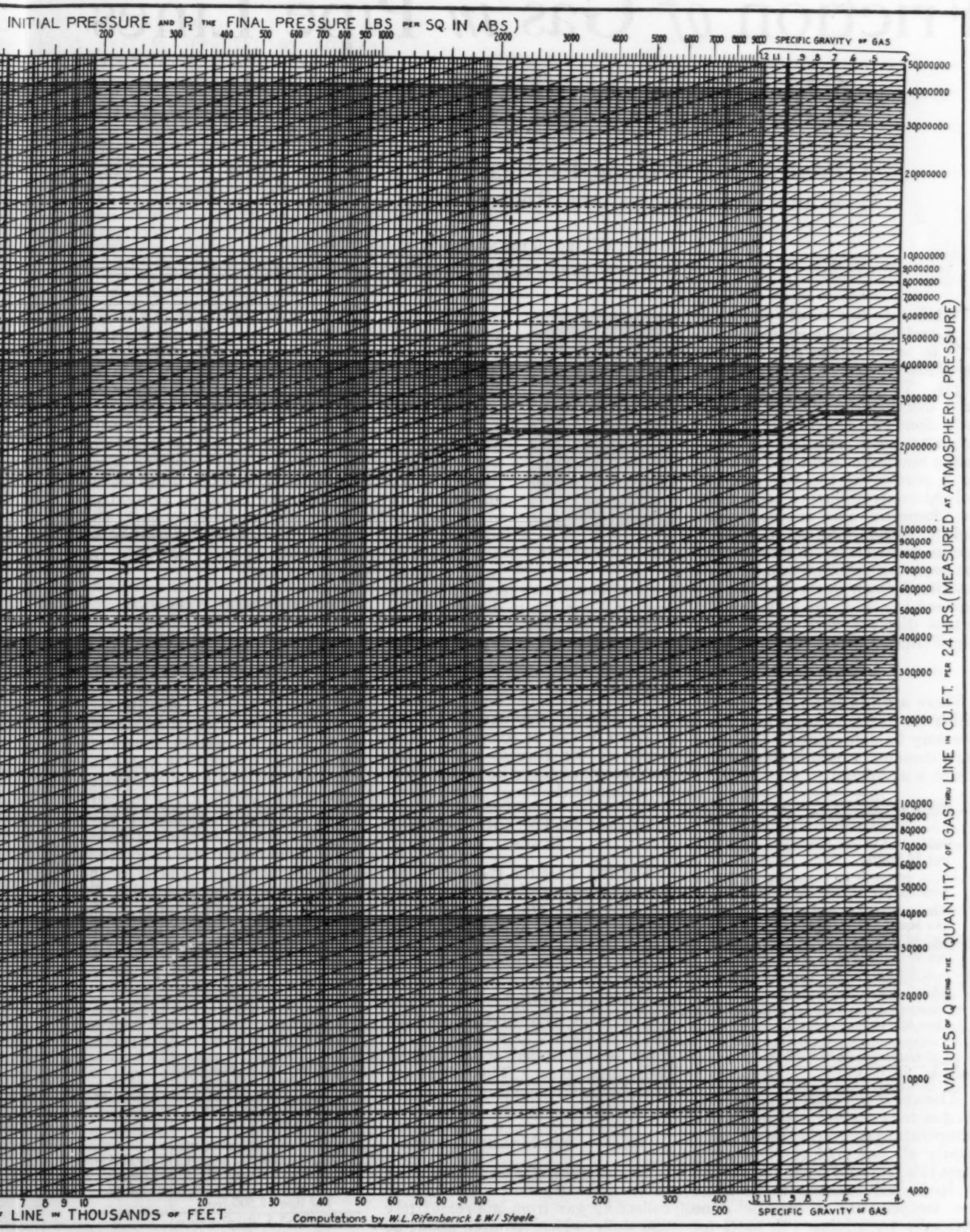
A CHART FOR COMPUTI


NOTE.-
The Top & Bottom Scales ($P_1^2-P_2^2$ & length of line) on the Lower Diagram only, may be multiplied or divided by 10, 100. etc.
VALUES OF $P_1^2-P_2^2$ (P_1 BEING THE INITIAL
INSIDE DIAMETER OF PIPE
LENGTH OF LINE

INSIDE DIAMETER OF PIPE INCHES	"a"
1	1.
1½	2.93
2	5.92
3	16.5
4	34.1
5	60
6	95
8	198
10	350
12	556
13½	725
15¼	1025
17¼	1410
19¼	1860

WESTE
GAS

UTING GAS LINE FLOWS



STERN
AS

Copyright 1927 by WESTERN BUSINESS PAPERS, Inc.
626 South Spring Street, Los Angeles, Calif.

Friction *of* Gas *in* Pipe Lines Computed *by* Graph

Presenting *a* Working Explanation *of the* Flow Chart Which Appears *on the* Reverse Side *of* This Page

By W. L. RIFENBERICK
President, Mutual Gasoline Company

ONE of the most common problems a gas engineer has to solve is the size of pipe line or lines to carry a given amount of gas. The problem is the same for a distribution engineer laying out a domestic gas system as it is for an engineer collecting wet gas from a number of wells and returning a portion of the dry gas for fuel—the only difference being that the domestic gas engineer has slightly better data, as a general rule, to work with. In either case, however, the problem usually narrows itself down to the size of pipe required to carry a given volume a certain distance with a predetermined friction drop.

FORMULA

There are numerous formulae by which the pressure drop in a pipe line may be determined. The one most commonly used is Oliphant's, which is as follows:

$$Q = 1008a \sqrt{\frac{P_1^2 - P_2^2}{L}} \times \sqrt{\frac{.6}{G}} \times K$$

Q = Cubic feet of gas flowing through line per 24 hours.

P_1 = Gas pressure at beginning of line in pounds per square inch, absolute.

P_2 = Gas pressure at end of line in pounds per square inch, absolute.

L = Length of gas line in miles—(Chart made for length in feet).

G = Specific gravity of gas (Air taken as unity).

a = Constant depending upon size of pipe (See left side of chart).

K = Temperature correction factor =

$$1 - \left(\frac{\text{temp. gas in } ^\circ F - 60}{500} \right)$$

The chart is constructed for 60° F. gas temperature and omits the temperature correction factor, as in nearly all practical gas line problems this factor is negligible. When it is desired to correct the chart for temperature it can be done mentally by adding 1% to Q for every 5° below 60°F. and subtracting 1% for every 5° above 60°F.

W. L. Rifenberick

If one has a complicated network of pipe lines to lay out to collect gas from a large number of wells, where the gas pressure at the well is about atmospheric, and has to get it into a compressor plant with a certain pressure drop; or if one has to distribute gas under low pressure to a large number of consumers, the pipe friction must be accurately determined. The same is true in transmitting gas long distances under high pressure. Regardless of the nature of the problem, it can be solved with the chart on the reverse side unless the amount of gas to be transmitted falls without the range of the chart.

CHANGE OF TOP AND BOTTOM SCALES

The top scale for $P_1^2 - P_2^2$ can be multiplied or divided by 10, by 100, by 1000, etc., providing the bottom scale is multiplied or divided by the same factor. Thus should the value of $P_1^2 - P_2^2$ be 15,000, the top and bottom scales can be both multiplied by 10 and the problem then solved. It must be remembered that both scales must be multiplied or divided by the same factor. The scales for Q and pipe size can not be changed in the same manner.

REASON FOR MAKING CHART

At one time it was the author's problem to lay out a gas system collecting gas from approximately 300 wells, which required about 20 miles of gas lines ranging in size from two-inch to ten-inch. To do this would have been an endless task without the use of this chart. The longest line in the complicated network was one mile. The pressure at the end of the line was atmospheric, and the compressor plant intake pressure was a 10-inch vacuum. After the lines were computed, laid, and in operation, the pressure drops were the same as computed, which is an excellent test for the chart. In computing the size of lines in a network, the starting point may be either at the compressor plant or at the tip end of the line.

USE OF CHART EXPLAINED

The use of the chart can best be explained by a few examples, which will be given below, and the solutions as well.

The chart does not solve the factor $P_1^2 - P_2^2$. A chart was made up to solve P_1 and P_2, but it is just as easy to take the values of P_1 and P_2 from a table of squares or from a slide rule. The pressure at one end of the line must always be known and if the value of $P_1^2 - P_2^2$ is found from the chart, it is either deducted or added to the square of the pressure known, depending upon which one is the known pressure. The value of the other pressure is found from the square root tables.

PROBLEMS SHOWING USE OF CHART

No.	Given or Known Quantities	To Find
1.	P_1 = 57.5 lb absolute. Q = 2,630,000 cu. ft./24 hrs. G = 0.73. Size of pipe 6", length of line 12,500 feet.	P_2 = 57.5 − 23.7 = 33.84 lb absolute.
2.	P_2 = 33.8 lb. absolute. Q = 2,630,000 cu. ft./ 24 hrs. G = 0.73. Size of pipe 6". Length of line 12,500 feet.	P_1 = 33.8 + 23.7 = 57.5 lb absolute.
3.	P_1 = 57.5 lb absolute, P_2 = 33.8 lb absolute. G = 0.73. Size of pipe 6". Length of line 12,500 feet.	Q = 2,630,000 cu. ft. / 24 hrs.

NEEDED IMPROVEMENTS TO GAS SYSTEM APPROVED BY VOTERS

The municipal election recently held at Long Beach, Calif., resulted in ample funds being assured the municipal gas department for needed additions and betterments to its system. Voters signified their approval of the recommendations made by the city manager and Superintendent White of the gas department, by a vote of nearly three to one in favor of the bond issue.

Plans and specifications for a gas storage holder of a capacity of 10,000,000 cubic feet have already been prepared and it is expected that this much needed equipment will be in readiness for the fall demand.

Changes in compressor plants, new mains in the Harbor District, and the acquisition of the North Long Beach gas system are the other improvements which will be made in the order named.

With the coming in of the new Seal Beach and Alamitos Heights oil and gas fields the gas department is assured of sufficient natural gas to meet the demands of its local domestic and industrial consumer for some time, and with the additional storage equipment should be able to adequately supply the city system during the days of very heavy demand, such as was experienced this last winter.

The Long Beach domestic rate is fifty cents per thousand, and the industrial rate schedule drops to as low as fifteen cents for quantity users.

KANSAS ELECTRIC USES GAS TO GENERATE ELECTRICITY

Gas from the Lipps field, northwest of Elmdale, Kan., is now being used by the Kansas Electric Power Company under the boilers of its generating plant, the gas having displaced coal for this purpose. Residents of Emporia will be given the advantage of natural gas service when the city and the Emporia Gas Company come to agreement on franchise terms.

RIO GRANDE BOND ISSUE

An issue of $3,500,000, first mortgage bonds has been sold by the Rio Grande Valley Gas Company to finance a pipe line project which will bring gas to a number of communities of the lower end of the Rio Grande Valley, centering around Brownsville, Texas. The company has contracted to furnish the gas to various municipalities, utilities and industrial users of that regon, its gas being secured from two Texas oil producing companies.

DECLARE THREE PART RATE IS REASONABLE AND LAWFUL

In the case of the appeal of the Wichita, Hutchinson, and Newton Gas Companies from the ruling of the Kansas Public Service Commission which declared that the Three Part Rate in the cities named was unreasonable, the referee for the Kansas district court at Topeka has declared the Three Part Rate reasonable and lawful. The companies had appealed to the court for an injunction restraining the commission from interfering with the institution of the Three Part Rate.

GAS POSSIBLE FOR COUNCIL GROVE, OKLA.

C. A. Nicoll interests have made a gas survey in Council Grove, Okla.;these interests control a gas franchise for that community. There is prospect of sufficient gas for the community's needs being developed in a field northwest of Council Grove.

A Ghastly Rime

By WALT STOWELL
Production Bureau
Portland Gas & Coke Company

[*From the "Gasco Bulletin"*]

I STOOD upon a crowded street where many come and go.
I listened to the tread of feet, some fast and others slow,
And in the faces of the throng that swiftly passed me by
I thought I sensed in some a song. In some I sensed a sigh.
Why should it be that some should smile and others be cast down?
I beckoned to an aged man who seemed to know the town.

"Who is the man with beaming face who lately passed us by?
He acts as though he owned this place along with earth and sky.
His manly stride, his air of pride, the garments that he wears
Proclaim to me that he must be one of your millionaires."
"Not so," my ancient friend replied, "Though fortune he amass,
His greatest wealth is perfect health—he heats his house with gas."

"That stylish matron, who is she, that passed the other way?
Her eye is bright, her step is light, although her hair is gray.
Her charming grace, her smiling face, her features fairer far
Than any maid of royal shade. Is she a movie star?"
My aged friend to this replied, "She is no movie queen.
The while she shops, a motor flops her Easy wash machine."

"And who are you, my kindly friend?" I then made bold to ask.
"Have you the strength to carry on with each and every task?"
"Thank God, I have," the old man said. "My life has long been spared,
For what I eat, both bread and meat, with gas has been prepared,
And when at length my waning strength shall force me to retire
I hope and pray I'll pass away before a Radiantfire."

"One question more, my learned friend, before we bid adieu,
Who are these sad faced, sickly ones upon the avenue?
Pray tell me, please, what grave disease afflicts them with its curse,
Mayhap the pip or else the grip or something even worse?"
The aged guy then winked his eye and slowly shook his head,
"That man's an ass who doesn't use gas," were all the words he said.

I bade my aged friend goodbye amid the busy throng,
Nor do I longer wonder why our lives sometimes go wrong.
So many homes are torn with strife. In every rank and class
You find some husband or some wife refusing to use gas,
And love, I'm sure, cannot endure where prejudice holds sway,
But life is sweet if you cook and heat with gas, the modern way.

C. B. BABCOCK TO REPRESENT NEW LINES ON COAST

C. B. Babcock Company has been appointed the Pacific Coast representative for the Kleenburn Company, Milwaukee, Wis., manufacturer of the "Kleenburn Cinerator." The Babcock Company will also represent the Connelly Iron Sponge & Governor Company of Long Island City, New York.

SUIT FOLLOWS PRIVATE LINE OPERATOR'S ACTIVITIES

A business man of Collinsville, Okla., says a newspaper item, has piped gas into that community from his own gas field near the city and has connected the line to his home and to an ice plant which he owns. The same report says that the operator, without the formality of applying for a license, then connected up the public school building to his line, taking out the meters of the Collinsville Gas Company—whereupon that utility entered suit for damages and for an order prohibiting the private operator from interfering with its connections. A temporary restraining order has been granted, pending trial.

COAST COUNTIES SHOWS GOOD EARNINGS RECORD

The Coast Counties Gas & Electric Co., Northern California, showed net earnings of $12.46 a share on first preferred stock, $18.26 on second preferred and $12.36 on common, according to its 1926 stockholders report, made the latter part of March.

BATES GETS MANAGERSHIP

Ferd T. Bates, assistant manager of the Richmond, Mo. office of the Missouri Gas & Electric Service Co., has been made manager of the same company's office at Liberty, Mo., following the resignation of the former manager, E. E. Zander.

PLAKE MADE VALUATION ENGINEER FOR COMMISSION

F. M. Plake, assistant valuation engineer for the Missouri Public Service Commission, has been made chief valuation engineer, succeeding James L. Harrop. Mr. Plake has been with the commission for the past four years as assistant valuation engineer, having been formerly employed in the valuation department of the Interstate Commerce Commission.

Groundwork Laid *for* Appliance Sales Week *in* May

THE date for the Spring Campaign of the Gas Appliance Society of California has been changed to May 1-7 instead of April 24-30 as first announced. This change, in the opinion of the gas appliance retailers, will greatly increase the volume of business to be done directly during the week. The Campaign Week program, which has been completed and is now being placed before the various units of the Society, is as follows:

1. The basic feature of the Week is the oven heat control. As the plan now stands, the dealers in San Francisco, Oakland and throughout most of the territory will give the oven heat regulator free of charge on ranges selling at $100 or more without the regulator. This amounts to approximately an $18 reduction in the price of ranges sold during the week, which should stimulate direct sales considerably. The purpose in making this special offer is three-fold:

First: To acquaint the public with the advantages of having an oven heat controlled range, as a means of securing replacement business.

Second: To increase the average price of ranges sold.

Third: To increase the volume of business during the "Week."

2. The second principal feature of the Week is the Menu Contest which is designed to develop a local reader interest and to make the Week less commercialized and more educational. This contest is for the best menu together with its accompanying recipes for a dinner for four people, the ingredients of which cost not to exceed $2. Local merchants in each community where the contest will be conducted will offer a number of attractive merchandise prizes. The winners of the various local contests will have their menus forwarded to the Gas Appliance Society's State Headquarters for a second judging. The Society is offering prizes, as follows:

First Prize	$100.00
Second Prize	50.00
Third Prize	25.00
Fourth Prize	15.00
Fifth Prize	10.00

The winning menus will be used in securing follow-up publicity for the week.

3. The third and basic feature of the Week is the participation of local dealers, through whom the Campaign is actually conducted, with their newspaper space, window trims, store displays, cooking schools, store demonstrations and sales plans.

To assist the newspapers in obtaining more advertising and likewise to furnish them with material for free publicity, the Society is again issuing a 16-page sample newspaper supplement. As an aid to the window trims, the Society is furnishing new and attractive window posters, together with some smaller cardboard posters.

A bulletin was sent to all dealers the last week in March outlining the various features of the Campaign and urging them to make preparations now for their part in the Week's program. There will be no general window trim contest this year. However, several of the local units will arrange contests among their members.

INSTRUCTION MANUAL ISSUED BY LINCOLN ELECTRIC

The Lincoln Electric Company of Cleveland has just issued the 1927 edition of its Instruction Manual. This publication covers the latest practices used in manual electric arc welding. Among the subjects treated are: High speed steel welding, high pressure pipe welding, automobile frames, boiler repairs, welding cast iron, manganese steel welding, carbon arc welding, manufacture of machinery and equipment using welded steel in place of castings. The price of the manual is $1.00.

HENRY L. DOHERTY NO LONGER IN ACTIVE WORK

Henry L. Doherty, president of the Cities Service Co., has addressed a letter to stockholders of his companies announcing that he never expects again to take an active part in the routine work of the business. Poor health is the reason given for his decision.

NATURAL GAS TO SAVE MONEY FOR WICHITA FALLS INDUSTRIES

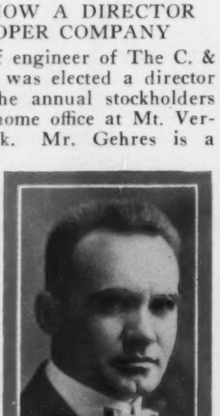
Wichita Falls, Texas, is now enjoying cheap industrial fuel, as a result of the completion of the 154-mile pipe line of the Northern Texas Utilities Company. The city's chamber of commerce estimated an annual saving of more than $1,000,000 would accrue from use of the new fuel.

GAS PRODUCTS COMPANY TO APPLY TO SERVE BAKER

Gas Products Company, manufacturer of carbon black from gas near Baker, Mont., will apply to serve natural gas to Baker, now being served by the Montana Petroleum Company. Gas is at present supplied at 29 cents a thousand, with downwardly graduated scale for large users.

H. A. GEHRES NOW A DIRECTOR OF C. & G. COOPER COMPANY

H. A. Gehres, chief engineer of The C. & G. Cooper Company, was elected a director of the company at the annual stockholders meeting held at the home office at Mt. Vernon, Ohio, last week. Mr. Gehres is a graduate of the engineering college at Ohio State University of the class of 1907. Since then he has had a wide engineering experience, most of which has been as a designer of internal combustion engines.



H. A. Gehres

After spending a year with the Indiana Steel Company he went to Bethlehem Steel, joining the Cooper organization in 1910 when Martin Thiel was in charge of engineering. At Mr. Thiel's death in 1920 Mr. Gehres was made chief engineer, since which time he has developed several new sizes of gas and oil engines now being used with success by the Cooper clientele. His influence as a designer has affected gas engine and compressor design generally. He developed the simple drag crank layshaft drive which is quite generally used today on the more successful gas engines. He also pioneered and successfully demonstrated the removable liner construction for compressor cylinders. Numerous other refinements in mixing valve construction and ignition systems are credited to his initiative.

The American Chemical Society will hold sessions in Richmond, Va., on April 13 and 14.

COOL WEATHER MEANS MORE BRIQUETS SOLD IN PORTLAND

Continued cool weather in Portland and vicinity during January, February and March has not only increased the gas send-out but has resulted in repeated orders for briquets from customers whose supply ran out. In the early months of 1926 the warm weather left most of the consumers' bins with one or two tons of briquets left over and this was quite a factor in reducing sales for the 1926-1927 winter season. The briquet manufacturing plant is now in full operation so that a maximum stock of briquets will be available for the 1927-1928 season. The Portland Gas & Coke Co. has a very successful plan for encouraging consumers to lay in their fuel in the summer months. By reducing the price and arranging for payments at the rate of one ton each month commencing in September, customers find it an advantage to take early deliveries. This keeps storage and delivery facilities of the company at a minimum.

Briquets are dispensed in carload quantities for sale by dealers in surrounding communities. Many cars have also been shipped to British Columbia where they are used largely by poultry raisers for incubator and brooder fuel. The use of the briquets as fuel for orchard heating stoves is also being developed. The apple orchards in the Hood River Valley consume large quantities of fuel for this purpose each year. The difficulty of ready ignition of briquets has been overcome by special treatment and after placing in the orchard heater, the application of a torch starts the fire. Being a slow-burning fuel, briquets are ideal for the purpose. Briquets are also sold extensively for manuacture of water gas.

CONGRESS APPROVES HELIUM LINE FROM NOCONA FIELD

Announcement comes from Washington of approval given by the House of Representatives to an appropriation of $563,000 for construction of a 25-mile pipeline from the Nocona field, which would connect with Petrolia facilities for handling helium bearing natural gas. The proposed line is to be of 10-inch construction with 960 h.p. compressor station.

C. F. BRAUN & COMPANY OPENS NEW YORK OFFICE

Announcement has been made by C. F. Braun & Co., manufacturing mechanical engineers of Alhambra, Calif., of the opening on April first, of a sales and engineering office at New York City in the new French Building, 551 Fifth Avenue. William D. Moorer, formerly manager of the Tulsa office, has been appointed district manager. The new office will make possible a closer contact with the clientele of the company on the East Coast and abroad. Other branch offices are now maintained at Tulsa, Okla., and Dallas, Texas.

DONNELLY JOINS NEW YORK OFFICE OF BOTFIELD CO.

Frank J. Donnelly has joined the New York office of Botfield Refractories Company, Philadelphia, and will cover the New Jersey territory under the direction of Chas. C. Phillips, New York district manager. Mr. Donnelly will co-operate with users of the firm's product, Adamant Fire Brick Cement.

WYCKOFF RESIGNS

Carl Wyckoff, manager of the Emporia Gas Company, Emporia, Kan., has tendered his resignation, to become effective when the Emporia Gas Company becomes the gas department of the Kansas Electric Power Company.

SECRETARY TELLS OF SUCCESS OF A.G.A. SALES CONFERENCE

REGIONAL sales conferences are becoming increasingly popular as an aid to better merchandising of gas and gas appliances. When the American Gas Association brought its sales conference activities to the Mid-West, in the sessions held from February 16 to 18, inclusive, at Chicago, there was an unprecedented response from gas men of the section. J. W. West, Jr., secretary of the Commercial Section of the A.G.A., writes *Western Gas* a resume of the Conference highlights, as follows:

"The Midwest Sales Conference was the most successful regional conference which we have ever held. All of the papers were confined to telling how gas was sold in the various domestic fields, refrigeration excepted, and more than 411 registered during the course of the conference.

"The trend of sales methods indicated by the Conference was substantially as follows:

1. Increased attention to commission and bonus forms of compensating appliance salesmen.
2. Increased use of free and trial method of placing appliances in customers' homes.
3. Continued use of long term payments.
4. Tendency toward the use of specialty salesmen on all except most staple appliances.
5. Efforts to work with architects and builders to an increasing extent.
6. Necessity for promotional rates from the commercial standpoint.
7. Intensive sales organization campaigns, etc.
8. Emphasis on comfort and convenience factors rather than appliances."

UTILITY SERVES LARGE PER CENT OF USERS AT LOSS

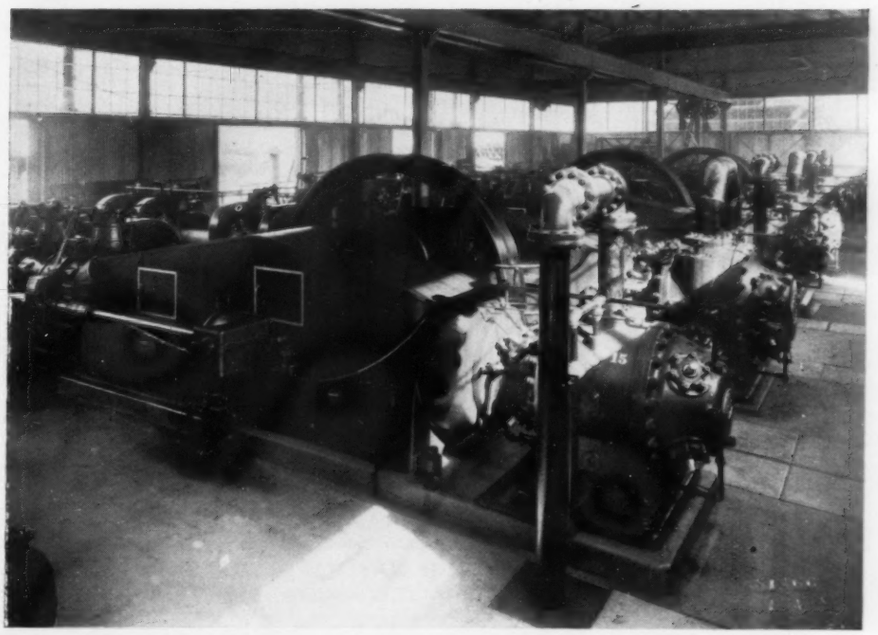
Seventy-two per cent of the customers of the Peoples Gas Light and Coke Co. of Chicago, are served at an actual loss to the company, according to a survey of the company's 778,807 customers recently made public.

It is estimated that to enable this company to pay operating expenses, set aside a fund for depreciation, and pay a fair return of 6 to 8 per cent upon the actual value of the property used in giving service, a consumer must use a minimum of 3,000 cubic feet of gas a month to enable the company to realize a small return on the account. According to the survey, 72 per cent of the company's customers use less than 3,000 cubic feet, and 54 per cent use more than 1,000 cubic feet, and 139,000 customers use less than 1,000 cubic feet.

In considering this survey it will be seen that equipment, measuring device, meter reading, billing and collection service is rendered to nearly 500,000 customers who do not use enough gas to pay the actual cost of the service given and gas used, much less a fair return on capital invested.

LAY 12-MILE LINE TO SERVE TOWN OF SUNBURST

Announcement of the immediate laying of a 12-mile gas line to serve the town of Sunburst, Mont., has been made by E. J. Hubbert, engineer for the Hardrock Oil Company. The line will be of six-inch pipe, will cost from $80,000 to $100,000 and will bring gas from the east end of the Kevin-Sunburst field. A four-inch line operated by the Treasure State Pipeline Company now serving the town has been found too small. The International refinery will be one of the major gas consumers. Gas will be distributed by the Consumers Gas Company, now in operation.



Increase Capacity *of* Ventura Compressor Station

These three twin-tandem four cycle Cooper gas engines have recently been added to the Midway Gas Company's compressor station at Ventura, Calif. They are of 760 horse power, direct connected, 19 by 24 double acting. Each unit has a daily capacity of five million cubic feet, with a 20-pound suction to 400-pound discharge. They constitute the first installation of this type in California.

TRAVELING OVEN ADDED TO GAS COMPANY LOAD

The Baker Bread Company of Portland, Oregon, has let a contract for the construction of a traveling bake oven to the Portland Gas Company. This oven is 12 feet wide, 56 feet long and will have a rated hourly capacity of 2150 one-pound loaves of bread. Portland Gas & Coke Company engineers designed the oven, incorporating many new features in traveling bake oven design. This oven will also be built by the gas company and will be installed and ready to operate by June 1st, 1927.

RATE INCREASE AUTHORIZED FOR WAGONER, OKLAHOMA

The Oklahoma Corporation Commission has revised gas rates at Wagoner, Okla., finding that the company should be allowed additional revenue. The following rate schedule became effective beginning with February, 1927: First 25,000 cu. ft., 65c. per M cu. ft.; next 25,000 cu. ft., 50c. per M cu. ft.; next 50,000 cu. ft., 40c. per M cu. ft.; all in excess of 100,000 cu. ft., 20c. per M cu. ft.; penalty 3c. per M.

TO DEHYDRATE SAN DIEGO GAS

Equipment for dehydrating gas distributed by the San Diego Consolidated Gas & Electric Co., by compression, is to be installed in the company's distribution plant. More modern apparatus is also being installed for meter testing and repairing.

COOKING SCHOOL IN WICHITA DRAWS 2000 ATTENDANCE

In co-operation with the Wichita (Kan.) Beacon, the Wichita Gas Company conducted a cooking school held in the Forum, Wichita. Over 2000 people attended the school on the opening day.

WAURIKA TO VOTE ON GAS

Waurika, Okla., on April 5 will vote on the Lone Star Gas Company's request for a natural gas franchise. If favorable action is taken by the citizens, approximately $150,000 will be spent to install the distribution system, which will be operated by the Community Gas Co., a subsidiary of the Lone Star Company. The Lone Star lines are connected with the Chickasha field and the company's main system in northern Texas.

HOUSTON PIPE LINE CO. HAS FINISHED 469 MI. OF LINE

The Houston Pipe Line Co. has completed 469 miles of gas lines in southwest Texas, a project started in May, 1925, for the purpose of supplying natural gas to refineries and other industrial plants on the Houston Ship Canal.

HOLD ELECTION ON FRANCHISE FOR COYLE, OKLAHOMA

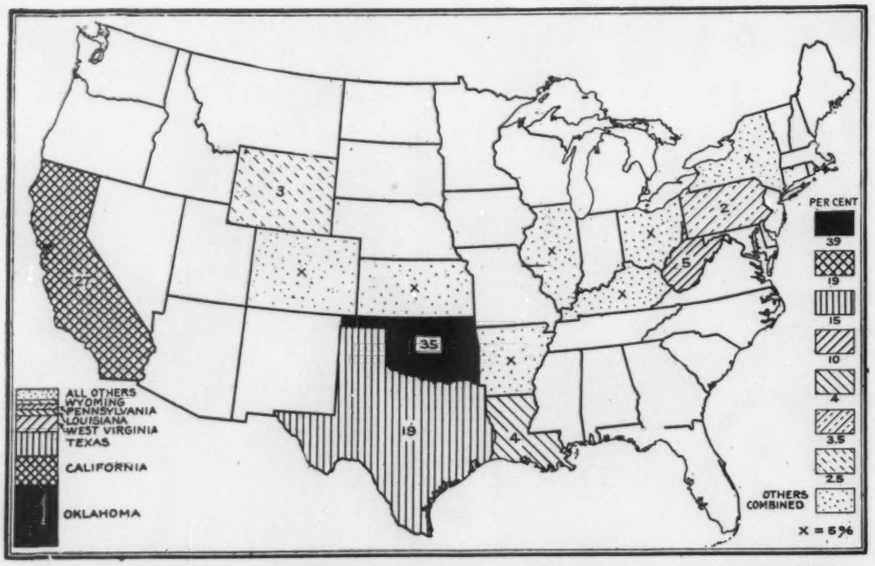
April 5 was the date for a special election in Coyle, Okla., on the question of granting a gas franchise to Guss Howerton and associates. November 1 was set by the prospective operators as the date for the line's completion in the event of favorable action on the franchise.

GAS NOW IN LAGUNA

Gas service began in Laguna Beach, to which lines of the Southern Counties Gas Co. were recently extended at a cost of about $160,000, on March 26.

CHERRYVALE, KAN., GETS GAS FROM WELLS IN CITY

Within the city of Cherryvale, Kan., there are 33 gas wells which supply one-third of the city's gas. The gas is sold by well owners to Tri-City Gas Company for distribution.



MAP SHOWING THE PERCENTAGE OF NATURAL GASOLINE PRODUCED BY THE VARIOUS STATES, IN THE PERIOD 1911 TO 1925

In the above map the figures inserted in the separate states represent the percentages of natural gasoline produced in 1925. The production percentages for the 14-year period may be read from the legend. In the table below is given detailed information on the 1924-25 production.

State	Number of operators reporting*	Number of plants	Raw (unblended) gasoline produced			Estimated quantity of natural gas treated	
			Thousands of gallons	Value at plant		Millions of cubic feet	Average yield per M cubic feet (gallons)
				Thousands of dollars	Average per gallon (cents)		
1924							
Arkansas	5	9	17,533	1,784	10.2	3,243	5.4
California	61	140	232,579	22,690	9.8	217,445	1.1
Illinois	29	85	9,091	795	8.7	3,451	2.6
Kansas	8	14	11,658	913	7.8	15,796	.7
Kentucky	8	10	7,274	769	10.6	24,618	.3
Louisiana	33	45	48,098	3,887	8.1	136,448	.4
New York	5	5	477	50	10.5	381	1.3
Ohio	26	47	9,443	1,148	12.2	38,865	.2
Oklahoma	108	281	301,062	23,338	7.8	172,111	1.7
Pennsylvania	127	191	19,254	2,266	11.8	63,104	.3
Texas	44	106	186,571	14,460	7.8	148,554	1.3
West Virginia	56	152	61,549	7,154	11.6	160,007	.4
Wyoming	8	11	329,272	2,979	10.2	32,253	.9
	*457	1,096	933,861	82,233	8.8	1,016,276	.9
1925							
Alaska	1	1	33	5	15.2	21	1.6
Arkansas	6	9	19,686	2,420	12.3	4,892	4.0
California	61	145	303,180	32,743	10.8	236,697	1.3
Colorado	1	1	35	4	11.4	15	2.3
Illinois	30	86	9,874	1,102	11.2	3,856	2.6
Kansas	10	15	19,592	2,223	11.3	27,648	.7
Kentucky	9	10	7,685	884	11.5	28,231	.3
Louisiana	31	44	43,489	4,216	9.7	113,873	.4
New York	5	5	414	46	11.1	320	1.3
Ohio	22	41	8,701	990	11.4	34,392	.3
Oklahoma	107	288	390,861	40,973	10.5	196,223	2.0
Pennsylvania	115	167	18,850	2,185	11.6	59,686	.3
Texas	51	117	214,092	22,606	10.6	149,525	1.4
West Virginia	47	141	58,201	6,759	11.6	150,626	.4
Wyoming	8	11	32,777	3,227	9.8	34,385	1.0
	*450	1,081	1,127,470	120,383	10.7	1,040,390	1.1

*A producer operating in more than one State is counted only once.

Natural-gas gasoline produced in the United States, 1924-25, by States

MOVE PLANTS TO BORGER

The Associated Producers Gasoline Co., which recently purchased the Cal-Tex Gasoline Co. of Los Angeles and its three gasoline plants in the Panhandle, is moving these plants to one location at Borger, Texas. The Cal-Tex Gasoline Co. had three portable units. In addition, the Associated is installing at this location a Southwestern "75" unit, and also is building a permanent plant a mile west of this site.

CHARCOAL PLANT OPERATING NEAR GREENWOOD, LA.

A new charcoal plant has recently been put in operation near Greenwood, La., by the Owl Oil Co. Residue gas from the company's gasoline plant is being utilized in the manufacture of carbon black. The gasoline plant is one of the new shop-built charcoal plants sold by the Gasoline Recovery Corporation and contains many features of the portable plant put out by this company.

SKELLY OIL COMPANY PLANT BUILDING IN PANHANDLE

Construction work has begun on the erection of the Skelly Oil Company's new natural gasoline plant located on its Schafer ranch in the Panhandle area, Texas. This property includes all of 13,000 acres, and the plant under construction is located in the southeast quarter of Section 88, Block 4, Carson County.

The new installation will have, at the start, a rated capacity of 20,000,000 cubic feet of gas daily. Gasoline will be extracted by oil absorption equipment. Five 320 horsepower Snow engine compressors comprise the booster station equipment for gas compression. Two 10,000 gallon distillation units operate in conjunction with the absorption plant. Charcoal plants will be employed as auxiliary units operating at well pressures, while the wells are on flush production, with the oil absorption plant employed later. This plant may later be more than doubled in size, as more of the large property is developed. Skelly now has four wells drilling on the lease.

Storage tanks for finished gasoline will have a combined total capacity of 1,000,000 gallons. A specially designed treating plant for sweetening the gasoline produced is being installed.

STANDARD GASOLINE CREATES NEW VENTURA DIVISION

H. V. Cowger, formerly supervisor for the Standard Gasoline Company in the Ventura district, is now division superintendent, since a new division has been formed of the Ventura district. Harry B. Snyder has become district supervisor; Fred Loomis, district engineer; C. B. Heartwell, division gas engineer. P. B. Glassey has been transferred from Ventura to Inglewood as district gas engineer, and L. R. McMasters has been transferred from Inglewood to the company's general offices in Los Angeles as assistant division gas engineer.

SIGNAL GASOLINE NEW OFFICE

A suite of 11 rooms on the fifth floor of the new Roosevelt Building, Los Angeles, now serves as office headquarters of the Signal Gasoline Company.

PETROLEUM SECURITES PLANT

Petroleum Securities Corp. has an absorption plant in operation in the Ventura field, treating gas from Orton No. 1, which is running about three-quarters of a gallon to the thousand.

WET GAS FOUND IN RICHLAND PARISH, LOUISIANA

Wet gas found in two tests in Richland parish, Louisiana, upset earlier ideas of the area northeast of Urania oil development, in the direction of the Mississippi river, because of the depths from which the flows are coming. Palmer Corporation's test in 33-17-6E is flowing 22,000,000 cubic feet daily, the gas testing 425 gallons of raw natural gas to the million cubic feet, at a total depth of 2,432 feet. Latex Petroleum in 22-17-5E, had 2,000,000 cubic feet of gas, testing 452 gallons of natural gasoline per million cubic feet.

ISOM, TEXAS, GASOLINE PLANT

The Federal Gasoline Co. of Amarillo, Texas, has started construction of its first natural gasoline plant. The plant, which will be at Isom, will be of a permanent type, and will have a capacity of 10,000 to 12,000 gallons of gasoline daily. Gas will be supplied from the properties of the Pantex Oil Co.

GASOLINE PLANT FOR ABRAMS

J. N. Abrams Company is erecting a 10,000-gallon daily capacity absorption plant in the Alamitos Heights field, at Long Beach, Calif.

PHILLIPS TO HAVE PLANT IN NOODLE CREEK FIELD

A casinghead gasoline plant will be constructed at once by Phillips Petroleum Co. in the Noodle Creek field, Texas. It will have a daily capacity of 6,000 gallons of gasoline.

GENERAL PETROLEUM ADDS NEW GASOLINE EQUIPMENT

The General Petroleum Corp. has recently installed a Campbell Oil Froth absorber and a Campbell stripper at its Sterling plant, Long Beach, Calif. At Ventura the same company has just put into operation a complete 20,000 gallon Campbell unit.

NORTH TEXAS OPERATORS MEET

Operators of natural gasoline plants in the north Texas fields held two meetings during the last week in March to discuss mutual operating problems. The meetings were sponsored by the Association of Natural Gasoline Manufacturers.

CAMPBELL CO. ESTABLISHES BRANCH OFFICE IN TULSA

J. A. Campbell Company, manufacturer of the Campbell Oil Froth Absorber, has established a branch office in Tulsa, Oklahoma. This office will be under the supervision of R. C. Flournoy, Jr., who will have the exclusive agency in the Mid-Continent territory.

APPROVE GASOLINE TEST CODE

The Natural Gas Association of America has approved the amended compression test code for testing gasoline content of natural gas as approved by the Association of Natural Gasoline Manufacturers. The amended code now will become the joint tentative code of the two associations.

ALAMITOS PLANT GETTING 4 GALLONS TO THOUSAND

Pan-American Petroleum & Transport Co. has its gasoline plant in operation at Alamitos Heights, the northwest extension to the Signal Hill field, and four gallons per 1000 c.f. are being extracted from the natural gas from Naples No. 1.

TEXAS OIL STARTS WINONA GASOLINE PLANT

The Texas Oil Company has put into operation its new absorption plant, 12 miles west of Winona. The plant has a daily capacity of 2,000,000 cubic feet of gas.

BARNSDALL PIPELINE

The Barnsdall Corp, has begun a 30-mile line of six-inch pipe to carry gas from its recently completed 90,000,000 cubic foot gas well in Okemah, Okla., to its lease in Earlsboro and Seminole.

STANDARD GASOLINE ADDS NINE ABSORBERS AT VENTURA

The Standard Gasoline Company has had nine Oil Froth absorbers constructed for installation in two of their Ventura plants. The absorbers were manufactured by the J. A. Campbell Company of Long Beach, Calif.

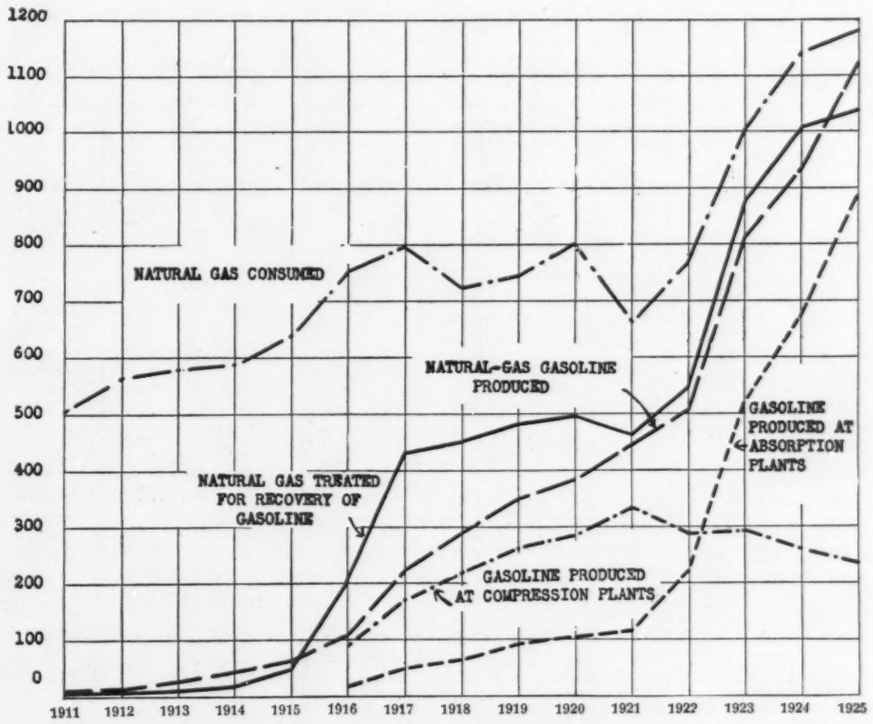


CHART OF NATURAL GAS CONSUMPTION AND NATURAL GASOLINE PRODUCTION, BY VARIOUS PROCESSES, FOR THE PERIOD 1911 TO 1925

Natural gas curves in the chart above are to be read in billions of cubic feet; gasoline curves read in millions of gallons. The table below shows natural gasoline production from 1911 to 1925, by states, in thousands of gallons.

Year	Arkansas	California	Illinois	Kansas	Kentucky	Louisiana	New York	Ohio
1911	.....	(*)	(*)	.....	(*)	.....	(*)	1,679
1912	.....	1,041	(*)	.....	(*)	.....	(*)	1,719
1913	.....	3,461	(*)	(*)	(*)	.....	(*)	2,073
1914	.....	7,581	1,164	(*)	(*)	.....	(*)	2,440
1915	.....	12,835	1,035	(*)	(*)	(*)	(*)	2,199
1916	.....	17,159	2,260	215	725	2,113	(*)	2,639
1917	.....	28,818	4,934	1,175	3,818	4,980	(*)	5,440
1918	.....	32,269	4,575	2,390	3,331	7,021	218	6,745
1919	.....	40,386	6,060	3,284	5,136	10,063	458	8,801
1920	.....	48,208	6,055	4,331	4,497	10,610	411	10,016
1921	.....	58,220	7,536	3,587	4,242	15,341	366	9,100
1922	4,289	67,120	7,760	2,856	5,205	29,406	506	8,600
1923	16,183	173,329	7,356	8,775	7,601	40,720	408	10,035
1924	17,533	232,579	9,091	11,658	7,274	48,098	477	9,443
1925	19,686	303,180	9,874	19,592	7,685	43,489	414	8,701
	57,691	1,026,186	67,700	57,863	49,514	211,841	3,258	89,630
Percent of total	1.1	19.3	1.3	1.1	0.9	4.0	(**)	1.7

Year	Oklahoma	Pennsylvania	Texas	West Virginia	Wyoming	Undistributed	Total	Value at plant: Thousands of dollars	Value at plant: Average per gallon (cents)
1911	388	1,467	.....	3,600	.....	232	7,426	532	7.2
1912	1,575	2,041	.....	5,318	.....	387	12,081	1,157	9.6
1913	6,463	3,680	.....	7,562	.....	722	24,061	2,458	10.2
1914	17,278	4,612	.....	9,278	.....	300	42,653	3,106	7.3
1915	31,566	5,899	(*)	10,854	.....	877	65,365	5,151	7.9
1916	48,360	9,715	1,293	18,765	.....	249	103,493	14,331	13.8
1917	115,123	13,826	6,920	32,669	.....	181	217,884	40,189	18.4
1918	163,701	15,775	7,326	37,604	1,579	2	282,536	50,364	17.8
1919	139,995	20,284	9,337	52,150	5,581	.....	351,535	64,197	18.3
1920	178,857	21,151	32,956	58,941	8,711	.....	384,744	71,788	18.7
1921	185,341	19,856	77,141	54,646	14,558	.....	449,934	61,815	13.7
1922	189,404	18,518	95,405	56,796	19,967	.....	505,832	72,711	14.4
1923	270,249	19,132	177,765	63,381	21,292	.....	816,226	77,268	9.5
1924	301,052	19,254	186,571	61,549	29,272	.....	933,861	82,233	8.8
1925	390,861	18,850	214,092	58,201	32,777	68	1,127,470	120,383	10.7
	2,090,323	194,060	808,806	531,474	133,737	3,018	5,325,101	667,682	12.5
Percent of total	39.2	3.6	15.2	10.0	2.5	(**)	100.0	.....	.....

* Included under "Undistributed." **)Less than 0.1 per cent.

Natural-gas gasoline produced in the United States, 1911-1925, by States, in thousands of gallons

Natural-gas gasoline produced in the United States, 1924-25, by methods of manufacture

State	Number of plants			Raw (unblended) gasoline produced (thousands of gallons)			
	Compression	Absorption including combination absorption process with compression and charcoal processes	Charcoal	Compression	Absorption including combination absorption process with compression and charcoal processes	Charcoal	Drip
1924							
Arkansas	.....	9	.....	.....	17,533	.....	.....
California	16	124	.....	13,520	219,059	.....	.....
Illinois	85	.....	.....	9,089	.....	.....	2
Kansas	5	9	.....	614	11,042	.....	2
Kentucky	3	4	3	1,128	5,182	964	.....
Louisiana	14	30	1	7,105	*40,952	(*)	41
New York	4	1	.....	333	144	.....	.....
Ohio	30	16	1	1,268	*8,170	(*)	5
Oklahoma	176	105	.....	117,424	183,128	.....	510
Pennsylvania	164	23	4	7,315	10,716	1,076	147
Texas	43	63	.....	66,995	119,478	.....	98
West Virginia	93	56	3	12,968	46,856	1,383	342
Wyoming	**1 5	5	.....	20,135	9,059	.....	78
	639	445	12	257,894	670,678	4,064	1,225
1925							
Alaska	.....	1	.....	.....	33	.....	
Arkansas	.....	9	.....	.....	19,686	.....	
California	9	136	.....	6,718	296,462	.....	
Colorado	1	.....	.....	35	.....	.....	
Illinois	86	.....	.....	9,874	.....	.....	
Kansas	3	12	.....	553	19,039	.....	
Kentucky	2	5	3	632	6,052	1,001	
Louisiana	13	29	2	7,802	*35,687	(*)	(†)
New York	4	1	.....	304	110	.....	
Ohio	25	15	1	838	*7,863	(*)	
Oklahoma	156	130	2	114,520	275,539	802	
Pennsylvania	143	20	4	7,706	9,066	2,078	
Texas	42	75	.....	56,067	158,025	.....	
West Virginia	83	54	4	11,168	44,438	2,595	
Wyoming	6	5	.....	21,995	10,782	.....	
	573	492	16	238,212	881,681	7,577	(†)

*Charcoal included under combination processes in order to avoid disclosing the production of individual operators
**Refrigeration.
†Not separately reported.

SANCTION OIL AND GAS LEASES

A bill authorizing oil and gas mining leases upon unallotted land within executive order Indian reservations has been signed by President Coolidge, marking the end of a five or six-year controversy affecting certain land in southeastern Utah.

CIENAGA PLANT WORKING

The Cienaga Corporation on March 20 put in operation at Huntington Beach, Calif., a high pressure stripper plant, manufactured by the J. A. Campbell Company of Long Beach. The plant will re-run gas from the line of the Southern Counties Gas Company. The plant will operate under 250 pound pressure and with a daily capacity of 10,000 gallons.

EMPIRE COMPANY STARTS ITS 1927 PIPELINE PROGRAM

Empire Natural Gas Company has commenced its 1927 program of pipeline construction with the letting of a contract for the laying of a number of gathering lines in the Seminole, Beardon and Earlsboro pools in the Seminole and Okfuskee county fields. These lines will be constructed from Okemah to Beardon, connecting this field with the Empire Natural Gas pipeline system at Okemah and will take care of the Empire's large volume of open flow in the area. This will place the Empire Natural Gas Company in a position to serve its own properties in the Seminole, Beardon and Earlsboro pools, as well as the demand for drilling gas in that vicinity.

As soon as these gathering lines, approximately 40 miles in length, are completed the Empire Natural Gas Company will connect them with its main pipeline system to Kansas and Missouri by the construction of a line to connect its Drumwright-Davenport main line with this production.

Merco-Nordstrom Valve Co. Locates Plant *in the* West

Oakland, Calif., plant of Merco-Nordstrom Valve Company, which will begin operation within a few weeks. The plant is at 24th and Peralta Streets.

INDICATIVE of the growing importance of the gas industry in Western America, comes the announcement that the Merco-Nordstrom Valve Company has decided to establish a complete manufacturing plant on the West Coast, the location to be in Oakland, Calif.

The new factory will be situated at the corner of 24th and Peralta Streets, Oakland, with an area of approximately 30,000 square feet. Installation of machinery is now under way, so that actual production will begin within a few weeks, according to the announcement of H. S. Shuey, secretary-treasurer of the firm.

The development of Merco-Nordstrom Plug Valves, in which this recent decision to locate a factory branch in the West is an important chapter, began in 1916 when Sven Johan Nordstrom, now vice-president of the company, conceived the idea of introducing lubricant under pressure to thoroughly cover the plug so that the pressure of the lubricant itself would offset any pressure coming through the line, thus solving many difficulties arising in handling liquids and air under pressure, due to the leaking and sticking of valves. Mr. Nordstrom was at that time in mining work in Mexico. The Merrill Company, of which the Merco-Nordstrom Valve Company is a subsidiary, entered into agreement with the inventor to develop and introduce the valve throughout America.

Manufacture and distribution of the valves were at first conducted by The Merrill Company, but in 1923 the Merco-Nordstrom Company was incorporated as a separate organization. The officers of the company are: Charles C. Broadwater, president; Sven Johan Nordstrom, vice-president; Herbert S. Shuey, secretary and treasurer—all of whom are directors of the company. The other directors are Charles W. Merrill, and Louis D. Mills, the former, president, and the latter, consulting engineer, of The Merrill Co.

MID-WEST CONVENTION PLANS TAKING SHAPE

C. A. Nash, of Davenport, Iowa, who is chairman of the program committee for the 1927 convention of the Mid-West Gas Association, has formulated a program for the sessions that is expected to draw a large attendance of gas men from all sections of the Middle West. On March 1 the program was approved by the executive committee at a meeting held for that purpose. Convention dates are April 20, 21, and 22, and headquarters are at the Hotel St. Paul, St. Paul, Minn.

Local arrangements and entertainment are in charge of Louis Stein of the Northern States Power Company. For the first time in the association's history the ladies will be in attendance at the annual convention.

Gas men from Iowa, Minnesota, Nebraska, North and South Dakota are included in the scope of the Mid-West Gas Association.

RE-CHECKERING GENERATORS

The 1927 program of the Portland Gas & Coke Co. calls for re-checkering 10 of their 20-foot diameter gas generators and replacing the lining of two of them . In addition to this, a new 27-foot diameter generator is being constructed. The total brick requirements will be in the neighborhood of 44 carloads of checkers and special shapes. The rebricking will start about May 1, sufficient brick being now on hand for checkering two of the generators.

B. C. ELECTRIC RAILWAY HELPS EMPLOYEES TO OWN HOMES

In July of last year the British Columbia Electric Railway Company set aside $50,000 to be loaned to employees to assist them in becoming home-owners. A committee was appointed to pass on the applications for loans, and to date 15 separate loans have been made, totalling $25,300. The company also renders employees valuable legal service in connection with buying property and construction of houses.

C. B. BABCOCK ON TRIP TO FACTORY HEADQUARTERS

C. B. Babcock, president of the C. B. Babcock Company, attended the annual sales meeting of the General Gas Light Company, held at Kalamazoo, Michigan, March 20, to April 1. After spending several days at factory headquarters of lines which he represents on the Pacific Coast, Mr. Babcock will return to the Coast about April 11.

SPEAKERS CONTEND ON "GAS VERSUS ELECTRICITY"

"Gas versus Electricity" was the extremely controversial topic of a three-minute speaking contest held by the Los Angeles Gas and Electric Corp. Employees' Association on March 16. Evidently the L. A. G. & E. men are working into shape for another Pacific Coast Gas Association fray.

HIRE NOW AT ALTUS

J. N. Hire is now local manager for the Southwestern Gas and Fuel Company in Altus, Okla. Mr. Hire was office manager for the same utility in Duncan.

PIONEER GAS MAN PASSES

Ed. L. Dunn, who established the communities of Oiltown and Shamrock, Okla., and built and operated their first gas distribution system, died in Los Angeles in March. His later years were spent as an oil and gas operator in Orange County, California.

Gas Meter Short Course Due *in* April *at* Norman, Ok.

THE annual Southwestern Gas Meter Short Course will be put on in the Engineering Building, University of Oklahoma, at Norman, Okla., April 5, 6 and 7. Indications are favorable for a large attendance, more than one hundred gas representatives having already made advance registration.

In addition to formal features, papers will be read by the following gas men covering subjects as indicated: E. L. Rawlins, natural gas engineer, Bureau of Mines, Bartlesville, Oklahoma, "Recent Experiments on Straightening Vanes and Pipe Line Flow Formulae"; A. J. Kerr, engineer, Equitable Meter & Manufacturing Company, Tulsa, Oklahoma, "Regulating Pressures and Measuring Natural Gas". paper by natural gasoline man, subject yet unannounced; Walter Reid, consulting engineer, Dallas, Texas, "The Relation of Specific Gravity to Measurement"; J. P. Fisher, chief technologist, Empire Companies, Bartlesville, Oklahoma, "Cleaning Natural Gas"; C. E. Mason, engineer of Foxboro Company, Tulsa, Oklahoma, "New Developments in the Design of the Orifice Meter"; R. S. McBeth, director of public relations, Oklahoma Natural Gas Corporation, Tulsa, Oklahoma, "Public Relations"; John Diehl, engineer Metric Metal Works, Erie, Pennsylvania, "Large Volume Gas Measurement at High and Low Pressures." In addition to these papers addresses on general subjects will be delivered by Dr. W. B. Bizzell, president, University of Oklahoma; E. F. McKay, Oklahoma City, manager, Oklahoma Utilities Association; J. H. Felgar, dean of the College of Engineering, University of Oklahoma, and others.

PIPE MAKING IN PICTURES

An interesting feature will be a motion picture presented by the National Tube Company covering the subject "Arteries of Industry." This picture will show all of the processes in the manufacture of all classes of pipe including gas pipe.

Each afternoon during the short course there will be class room instruction and shop work under supervision of competent instructors furnished by the University and several of the gas and meter manufacturing companies. The very latest in natural gas measurement equipment will be used in this demonstration work.

Natural gasoline manufacturers will share for the first time in the meter short course, program particulars for the gasoline men being arranged in connection with the Natural Gasoline Manufacturers' Association, which has its headquarters in Tulsa, Okla. The short course is sponsored by the Oklahoma Utilities Association and the University of Oklahoma conducts the course with the cooperation of the Association and the Oklahoma Corporation Commission.

SAFETY DISPLAY AT COOKING SCHOOL, SAN ANTONIO

The San Antonio Public Service Co., San Antonio, Texas, co-operated with the Express-News of that city in a cooking school conducted in San Antonio in March. The school was attended by more than 1000 persons. Safety Supervisor Harold A. Briggs of the company prepared a special safety display booth, featuring proper operation of gas appliances, with talks on conservation and safety.

TAR SALES LARGE

During 1926 about 720,000 gallons of tar were sold by the Portland Gas & Coke Company as "Gasco Road Binder," a covering for macadam roads.

SPOKANE GROSS SALES RISE 30 PER CENT IN 1926

Gross gas sales of the Spokane Gas and Fuel Company in 1926 rose 30 per cent over the year previous, more gas being sold than in any other year in the company's history. The coke supply was also reduced from 8,000 tons to a complete vanishing point. One of the new factors in the company's activities has been a cooking school and demonstration class.

NEW BUILDING FOR TURLOCK GAS COMPANY

The office of the Turlock Gas Company, Turlock, Calif., is to be torn out and replaced by a new brick edifice. Pacific Lighting Corp. recently took over the Turlock company.

36-FOOT CONVEYOR BOUGHT

Purchase of a 36-foot Barber-Greene portable conveyor has been made by the Portland Gas & Coke Co. The conveyor will be used principally for loading briquets in bulk into cars and for general purposes around the plant, such as unloading generator brick.

CONSERVE MONROE GAS

Operators in the Monroe gas field have effected an agreement among themselves at the instance of the Interstate Natural Gas Co. to further conserve the gas field and the high pressure wells by cutting out all of the big wells which have been pulled on heretofore for gas to burn in carbon black plants. In the future all gas burned in carbon black plants will come from wells with a low rock pressure.

NEW BOOK ON FLAME AND COMBUSTION IN GASES

William A. Bone and D. T. A. Townend are authors of a book entitled "Flame and Combustion in Gases." The book will contain a review of research in this field since 1880, with other sections devoted to ignition phenomena, flame propagation through explosive mixtures, detonation flame structure and temperatures, pressure development during gaseous explosions in closed vessels, the mechanism of combustion, and catalytic or surface combustion. Photographs of flame movements and photospectograms will also be included. Messrs. Longmans, Green and Company are publishers.

CARBON BLACK PLANT READY TO OPERATE

For several months a force of 30 men has been erecting a 38-unit carbon black plant on the Cisco Dome in Grand County, Utah, for the Crystal Carbon Co. Preliminary tests have been run on the plant. Gas is being taken from the well brought in two years ago by the Utah Oil Refining Co. with an initial flow of 90,000,000 cubic feet, and two additional wells have been drilled by the carbon company. C. F. Clay, W. C. Benton and J. S. Hubbard incorporated the Crystal Carbon Co. in March, 1926, with a capital of $500,000, these operators being identified with the Col. A. E. Humphreys interests of Denver.

What Is Greatest Present Need *of the* Gas Industry?

Each month WESTERN GAS is publishing one of the three-minute speeches made on the above subject at the Pacific Coast Gas Association Convention of 1926. The following speech was delivered:

By GEORGE BOWERSOX
Southern California Gas Company

FROM the subject "What is the Greatest Present Need of the Gas Industry" one would think that the gas business had gone to rack and ruin. Well, it hasn't.

The big problems of the gas industry have been solved, and by solving them there has been produced the most flexible fuel that is known. The thing that we have to realize is the real worth of our product and our task is to bring out this value so the consumer can see it. What's the use of having a gold mine and not working it? That is our situation exactly. We have something that is so good it eliminates any competition and we are too modest to shout the merits of gas from the house tops.

While we are attending this convention we get all "hopped up" about the good qualities of gas, but you know the gas was just as good before we came here as it is now. Instead of just trying to increase the revenue by adding more ranges and water heaters on the line, devise means to use gas any time, any place heat is required.

One of the best ways of doing this is to incorporate automatic temperature and pressure controls. Of course, these cost more money, but is there one of you who would use a coal oil lamp in your home? Why not? It is cheaper. But we have become so used to the convenience that we would not do without it. The same thing applies to the gas installations, because the consumer becomes so accustomed to relying on the automatic features to produce for him a uniform product that he will never go back to hit-and-miss methods of production.

LEARNING FROM COMPETITORS

There is the place where a newer business—namely electricity—has taken advantage of our mistakes or oversight. Electrical installations are always equipped with protective and automatic devices. And right today electricity is a synonym for convenience to most of us. When we come to realize that our own product lends itself readily to automatic controls and that such equipment not only saves gas but eleminates waste and produces a uniform product, we will find that bigger and better jobs will come our way. To accomplish these results, we must work with the manufacturers and representatives of automatic control equipment and gas-burning equipment.

The historic "Sutter's Mill" where gold was first discovered, turned out good flour and brought the owner a good return on the money invested. But when it was realized that they had a gold mine waiting to be worked, it opened up a field where millions of dollars were made. Gas is our gold mine and if we work it right, it will make old Sutter's Mill look like a free will offering in a Scottish church.

COOKERY COURSE IN L. A. G. & E. AUDITORIUM

A cookery course of four day's duration, March 8 to 11, inclusive, was staged in the Los Angeles Gas & Electric Corporation's auditorium by Lutie V. Burkholder, Pacific Coast lecturer for the Tappan Stove Co.

PETROLEUM MARKETERS ASSN. CLOSES DOORS

On March 31 the Independent Petroleum Marketers Association of California, with offices at Los Angeles, closed its doors. Mergers of the refineries of many important association members was assigned as the chief reason for the move by H. H. Maxon, secretary and general manager of the association since 1915. In the field of natural gasoline statistics the association rendered effective service, and has a record of constructive work in many other departments of the oil industry.

EBERNHAM MAKING WESTERN TOUR FOR MERCO-NORDSTROM

C. C. Ebernham, Pacific Coast sales manager for the Merco-Nordstrom Valve Company, is making a month's tour of that firm's western agencies, including Denver, Salt Lake City, El Paso and Los Angeles.

CHAPLIN-FULTON MFG. COMPANY APPOINTS NEW DISTRIBUTOR

Mr. W. McKee, president of the Chaplin-Fulton Manufacturring Co. of Pittsburgh, Pa. has announced the appointment of Westcott & Greis, Inc. and Jno. W. Crawford to succeed J. H. Hill as Southern California representative for the Chaplin-Fulton company. Westcott & Greis also represent the Chaplin-Fulton firm at Tulsa, Okla., and Dallas, Texas.

CINCINNATI CONVENTION LOOMS AS BIG NATURAL GAS EVENT

Cincinnati, Ohio, is preparing to royally welcome members of the Natural Gas Association of America when that organization holds its annual convention, May 9-12. Headquarters will be at Music Hall, Elm Street. Program particulars will be available in *Western Gas* for May. Ample exhibition space has been arranged for in Music Hall, and many manufacturers have already taken booths.

ERICKSON IN LOS ANGELES

Arthur F. Erickson, president of the Arthur F. Erickson Co., of Portland, Ore. has established Los Angeles offices for his firm, which will be under his personal direction. They are located at 1520 W. 7th St.

CAMPBELL ADVANCED

G. S. Campbell, who has been with the Los Angeles Gas & Electric Corp. since 1903, has become assistant superintendent of gas distribution for the corporation, having formerly been foreman of the Pasadena gas shop.

REINKE CALIF. SALES MANAGER

R. D. Reinke is now district sales manager for California for the Westcott Valve Co. of New York. His headquarters are at the general offices of the Republic Supply Co., Los Angeles.

GAS TRANSMISSION MEASURE PASSES STATE LEGISLATURE

In its closing session, March 24, the Oklahoma state legislature passed Senate Bill 284, which would make it lawful to transmit gas outside of the state, and the bill now goes to the governor for his approval or disapproval.

TO USE METER COURSE PAPERS AS TEXT BOOKS

Oklahoma University Press is publishing the papers and lectures delivered in the Southwestern Gas Meter Short Course in 1926 in the form of two engineering bulletins which will in the future be used at texts.

OIL BURNERS ON WASTE HEAT BOILERS STOP SHUT DOWNS

DURING the past 2 years the Portland Gas & Coke Co. has installed three waste heat boiler units in connection with oil-gas generating sets which have practically replaced the original boiler installations except as stand-by units. These boilers have proven very satisfactory and economical and are in use constantly, except when a generating unit is down, which, of course, puts the boilers out of commission and requires falling back on the present oil-fired unit. This difficulty is being overcome by the use of an oil burner in connection with the waste heat boilers, which allows operation either by waste heat or as a direct-fired unit.

In choosing a burner, the chief requisite other than economy of operation is adaptability, as it is often necessary to place the equipment in operation upon short notice and remove the burner from the boiler when not operating, due to the extreme waste heat temperature. The Lodi Mayflower Removable Burner was chosen as best fitted for this purpose. This burner hinges directly onto the lower portion of the waste heat duct which lies in a horizontal position and swings completely out of the furnace and in the clear. When not in use, the burner opening is closed by a fire brick plug, when operating with waste heat.

This equipment allows the present units to be thrown into service in a few seconds time, the change being made from waste heat to oil-fired or vice versa without shutting down the boiler, thus keeping in operation an expensive piece of equipment and reducing the standby cost to a minimum.

MONTANA GAS CORP. BEGINS SERVICE IN HAVRE

Gas service has begun in Havre, Mont. The pipeline completed by the Montana Gas Corp. is to be buried as soon as weather conditions permit. Havre and Chinook are both getting their gas from the Bowes field. Two large industrial users, the Great Northern shops and the Utah-Idaho Sugar Co. plant, are now burning natural gas for their fuel needs.

COMPRESSOR PLANT BUILDS UP LINE CAPACITY

A test run of the new compressor plant of Houston Pipe Line Co. the latter part of March was expected to show an increase in the capacity of the line to nearly 100,000,000 cubic feet of natural gas daily. Runs have averaged around 70,000,000 feet daily for the last two months.

GAS IN CANADA

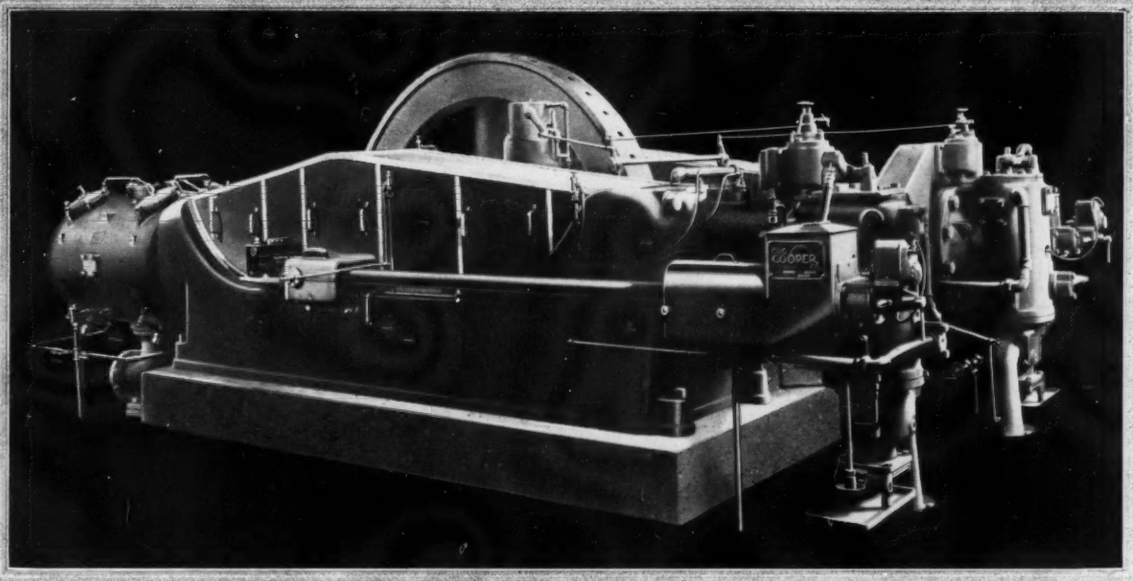
The Canadian Pacific Railway's weekly trade review devotes its entire issue of the first week in March to a discussion of the petrol and gas development which has been going on in Canada since 1884. In the West alone 400 wells have been put down, it says, and under direction, better results are now being obtained than in the past.

AWARD CONTRACT FOR MIDWEST PIPE LINE PROJECT

Ditching for 60 miles of the Midwest Refining Company's 12 and 14-inch pipe line from Little Buffalo Basin to Worland, Wyo., has been let to the Worland Construction Company of Worland.

GAS REPLACES COAL

When the Montana-Dakota Power Company completes a large addition to its boiler plant at Glendive, Mont., natural gas instead of coal will be used as fuel.



THE COOPER "TYPE 80" GAS ENGINE DRIVEN COMPRESSOR

Built in two sizes 85 B. H. P. as a single side and 170 B. H. P. as a twin unit. All corresponding parts on the single and the twin are interchangeable except the crank shaft.

These direct driven compressor units are used by so many of the larger oil and gas companies in such numbers that they are built on a quantity production basis and can usually be shipped from stock. Such production has made possible the use of drop forgings, die castings, and alloy steels. These, together with the improved design of both engines and compressors, result in users getting the greatest value for their investment.

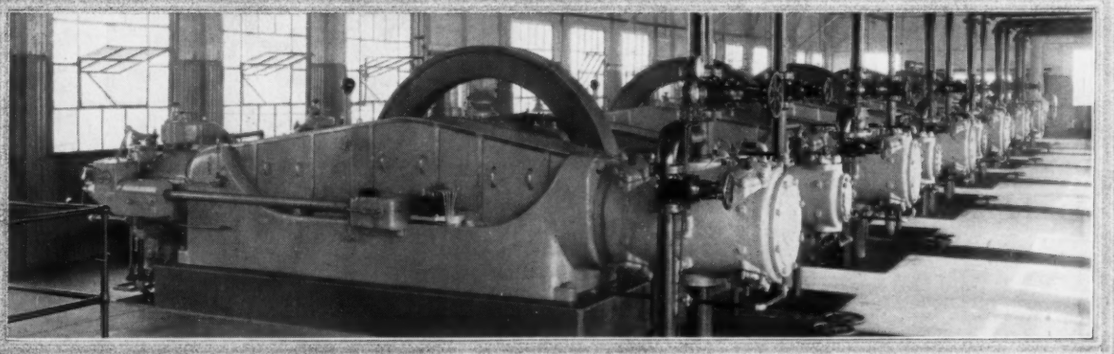
The engine without the compressor built with a special frame, is used for direct driving electric generators or for belt driving pumps, line shafts and other machinery.

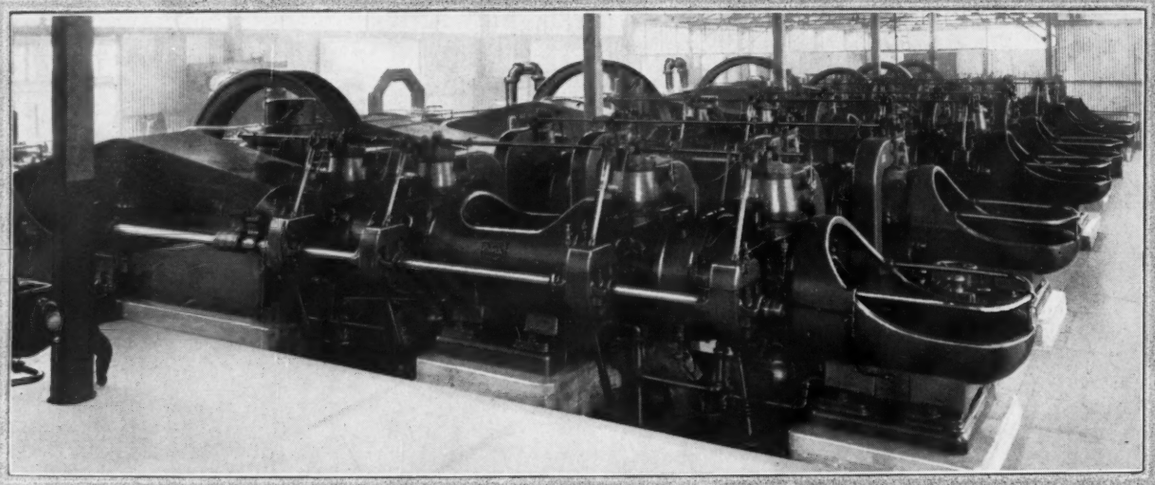
THE C. & G. COOPER COMPANY

MOUNT VERNON, OHIO

1605 Kirby Building, Dallas — 604 Kennedy Building, Tulsa

649 S. Olive St., Los Angeles





COOPER "TYPE-19"

This is a double-acting gas engine designed especially for the strenuous service imposed by continuous compressor loads where units of 200 B. H. P. and larger are desired. It is built as single cylinder 200 H. P.; twin cylinder 400 H. P.; single tandem 380 H. P. and twin tandem 760 H. P. units.

The installation above shows three of the 760 H. P. twin tandem units direct driving gas compressors in Midway Gas Company's Ventura, California, station.

This same general design is built with larger cylinders in sizes up to 1500 B. H. P. They are being used for driving electric generators and for every power purpose.

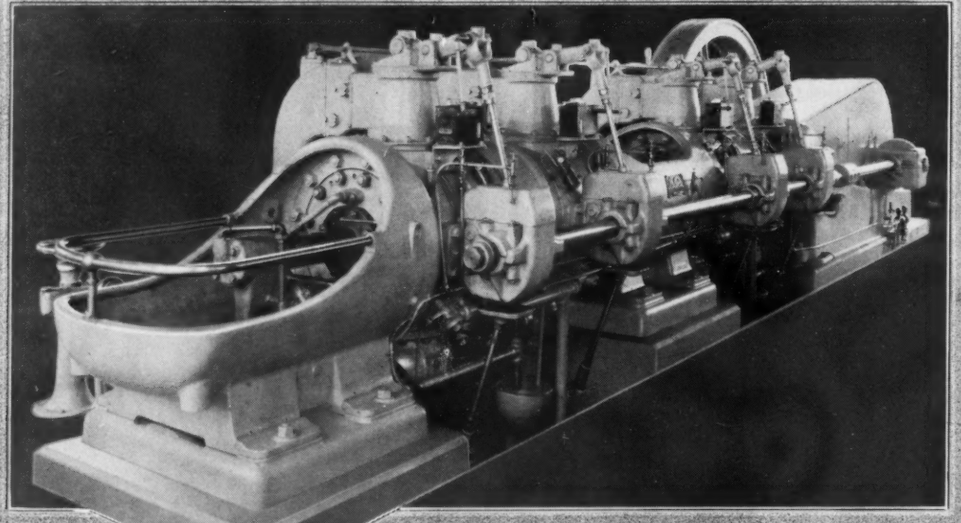
You eliminate all chance of disappointment when you select Cooper gas engines and compressors. They are built and guaranteed by a company that has been building engines for 94 years—almost a century.

THE C. & G. COOPER COMPANY

MOUNT VERNON, OHIO

1605 Kirby Building, Dallas 604 Kennedy Building, Tulsa

649 S. Olive St., Los Angeles



SMOKE ABATEMENT GAINS BY GAS IN CALCUTTA

That gas will be an important factor in all smoke abatement work is apparent on studying conditions in Calcutta, says the American Gas Association.

A survey of Calcutta in 1906 showed that the controlled smoke from factory chimneys was equivalent to 13.1 minutes of dense black smoke an hour, while there were only 100 gas appliances in use aside from those for lighting. Today there are more than 10,000 gas appliances in use in Calcutta and it is said that the utilization of gas has prevented the discharge of 1800 tons of soot and 700 tons of sulphuric acid a year. The average emission of controlled smoke from large factory chimneys is only 1. minute per hour, a ninety per cent reduction.

NAME MERGER ANNOUNCED BY SO-WEST UTILITY COMPANY

Two more utility companies in Oklahoma controlled by the Southwestern Light & Power company will bear the name of that company, according to announcement of Earl R. Ernsberger, president and general manager. These are the Southwestern Gas & Fuel company serving Altus, Temple, Lawton, Duncan, Marlow and Comanche with natural gas, and the Chickasha Gas & Electric company supplying electricity to 21 cities and towns. The recent additions now bringing the total number of towns served by this corporation to 77, located in 18 different counties of the Southwest.

O. G. & E. BUILDING EXPECTED TO BE READY BY JAN. 1, 1928

Plans have been completed for the erection of the new six-story office building of the Oklahoma Gas & Electric company at Third and Harvey Streets, Oklahoma City. The new quarters are expected to be ready for occupancy by January 1, 1928. The foundation will be designed to carry 12 stories so that the capacity of the building may be increased when found necessary.

PUBLISH SURVEY ON HELIUM IN CANADA

The Department of Mines of Canada announces the publication of a survey entitled, "Helium in Canada," by R. T. Elworthy, which gives a brief account of the resources, together with details of the methods employed in analysis and extraction, and an outline of the progress that has been made in the United States. Some possible industrial uses of helium are also reviewed.

BUILD SPUR LINE TO PLANT OF SKELLY OIL CO.

The Santa Fe Railroad has announced that it will build a spur from its main line at White Deer to the town of Skelly in Carson County, Tex., in order to take care of production from the Skelly Oil Co.'s gasoline plant which is located in Section 86, Block 4.

47 PER CENT OF GAS SOLD FOR HOUSEHEAT AND INDUSTRIES

Of all the gas sold in 1926 by the Portland Gas & Coke Company 47 per cent was used for industrial and house-heating purposes, as compared with 20 per cent used for these purposes 10 years ago.

GAS FOR ABERDEEN, AMORY

Timothy L. Driscoll and associates have been granted franchises to supply natural gas to Aberdeen and Amory, Miss.

A Year *of* Expansion *for* Natural Gasoline

(Continued from Page 19)

M.C.F.; the Bixby, at Seal Beach, 1,000 M.C.F.; the Selover, also at Seal Beach, 3,000 M.C.F.; and the present 12,000 M.C.F. Seal Beach plant, built to replace the Selover and Bixby plants. This construction, together with miscellaneous expansion items, called for an expenditure of approximately $500,000 in 1926. Two plants, one at Dominguez and the other at Santa Fe Springs, were shut down. A compressor plant is due to be added at Seal Beach this year.

LARGE PLANT AT VENTURA

Shell Company of California carried out a sizeable 1926 new construction program. Its Inglewood plant, a 6,000 M.C.F. installation, was built. The Ventura plant was enlarged in capacity by 40,000 M.C.F.,—an increase in daily gasoline recovery capacity of 45,000 gallons—in 1926, and by another 30,000 M.C.F. (56,000 gallons added gasoline capacity) early in 1927—making it what is said to be the largest gasoline plant in the world. Its daily gasoline recovery capacity is in the neighborhood of 150,000 gallons. To take care of the enormous yield of this plant a 100-mile natural gasoline line, probably the longest ever built to transport natural gasoline, is now under construction. This line is described on another page of this issue.

The Shell Company also added 14,000 M.C.F. to the capacity of its Brea Canyon plant—the equivalent of 22,000 gallons of gasoline recovery capacity. The Columbia-Olinda plant was shut down, its gas going to the Brea Canyon plant. Shell at present is operating 10 plants.

In the returns made by the Signal Gasoline Co., Inc. was included announcement of one California plant—No. 6, at Long Beach, 6,000 M.C.F., constructed last year; also two plants built in the Mid-Continent, one at Bristow, Okla., and one at Big Lake, Texas. The company has four plants in California. Plant No. 1 at Signal Hill was increased in capacity by 5,000 M.C.F., and Plant No. 5 at Long Beach by 3,000 M.C.F. last year. Eight miles of natural gasoline line were laid by the company. Its total expenditures for expansion in 1926, in California and the Mid-Continent, were in round figures $1,000,000. Rex Gasoline Corp. and the Signal Gasoline Corp. are subsidiaries of the California Gasoline Co., Inc. and are included in the foregoing.

STANDARD GASOLINE COMPANY

Three new plants and a number of important additions to existing plants were incorporated into the extensive system of the Standard Gasoline Company in 1926. Ventura No. 4, a 35,000 M.C.F. installation, was the largest single item. Another sizeable plant was erected at Huntington Beach, Huntington No. 3, of 28,000 M.C.F. capacity. Huntington Beach No. 7 was also built, a 7,500 M.C.F. plant. Since the first of the year the company has added its new Seal Beach No. 1, which at present has 12,000 M.C.F. capacity. These four new plants give the Standard Gasoline Company a total of 43 individual plants, three of which are booster installations and the remainder operating gasoline plants. This considerable system represents the combined plants of what was formerly the Pacific Gasoline Company, and the Standard Oil Company's plants.

Additions made to existing plants by the Standard Gasoline Company last year included the following: 3,000 M.C.F. additional capacity to 31-E; 5,000 M.C.F. additional to Huntington Beach No. 4; 4,000 to Santa Fe No. 2; 8,000 to Santa Fe No. 6; and 1,000 to 36-R plant, Elk Hills. Additions have already been made to one other plant this year.

One plant, 31-S, Elk Hills, was shut down last year, being dismantled and the equipment used at various other plants. During the year the company laid approximately 17 miles of gas collecting line, raising its total gas lines to about 215 miles.

GENERAL PETROLEUM CORP.

The chief project of the General Petroleum Corp. natural gasoline department was an addition to the Ventura plant which increased its capacity to about 30,000 M.C.F. One plant, the Vermont, at Athens, was shut down.

Several smaller operators report betterments made to their facilities in 1926. Holly Oil Company added two 165 h.p. compressors, an absorption tower, two 12,000-gallon pressure receiving tanks, and preheaters and heat exchangers to its Huntington Beach plant. The Lomita Gasoline Company installed a 165 h.p. compressor last year and this year added two strippers to its Long Beach plant.

WYOMING OPERATORS

Ohio Oil Company reports the construction last year of its Leo gasoline plant in the Lance Creek field, Niobrara County, Wyoming—an absorption plant of 3,000 M.C.F. daily capacity. To the same plant another 5,000 M.C.F. capacity was added this year with the installation of another absorber. Nineteen miles of natural gasoline line were laid in 1926. There are now 60 miles of gasoline line operated by the company.

New York Oil Company added 240 B.H.P. to its compression plant at Teapot Dome, Wyoming, and moved 485 B.H.P. to the same location from the Poison Spider field.

Midwest Refining Company last year laid about 50 miles of gas gathering lines for its Salt Creek plant, Salt Creek, Wyoming. The Midwest natural gasoline department operates 170 miles of gas lines as well as 42 miles of natural gasoline transmission lines.

Wyoming, and the Rocky Mountain region as a whole, while not particularly formidable as yet in the scale of their natural gasoline operations, will undoubtedly extend their activities to keep pace with oil and natural gas development.

While the foregoing survey of recent activities of Western natural gasoline companies is not to be regarded as comprehensive, it does include practically every major company in its scope. And it does more than outline the past year's accomplishments. It suggests that the enlargements and new construction reported herein can only mean one thing—more natural gasoline activity in the West.

TWITCHELL NOW CHIEF SPECIAL AGENT FOR L.A.G. & E.

O. W. Twitchell, formerly special agent, is now chief special agent for the Los Angeles Gas & Electric Corp., as a result of a general change in the special agent's department of the utility. R. M. Robinson, H. I. Ellenson and P. J. Kennedy are now special agents.

SANTA MARIA STOCK ISSUE

Santa Maria Gas Company has applied to the railroad commission of California for authority to issue and sell $105,000 of first and refunding mortgage six per cent gold bonds.

THEY STAY "PUT"

A Short Talk to Gas Company Executives

Comfort and Satisfaction with "PAYNEHEAT"

AFTER connecting those nice home heating jobs do you "sorta" hold your breath and wait to see what the consumer is going to say when he gets his first month's gas bill? Sometimes they just won't stay "put." Well, we've got a way of installing PAYNE GAS FURNACES so they do stay "put."

The illustration at the right gives you some idea of how it's done, but the best way to get the full story is to dictate a request for our Catalog 27-A. Free to executives.

PAYNE FURNACE & SUPPLY CO. INC.

Main Office, 338 Foothill Road, Beverly Hills, Calif.
Branch, 2247 Grove St., Oakland, Calif.
Branch: 115 E. Union St., Pasadena, Calif.
Branch: 478 Sutter St., San Francisco, Calif.

J. B. GILL CORPORATION

NATURAL GAS ENGINEERS

COMPRESSOR PLANT DESIGN AND CONSTRUCTION

P. O. BOX 669

LONG BEACH - - - CALIFORNIA

ANALYSIS OF NATURAL GAS

ACCURATE determination of the constituents of natural gas has proved a stumbling block to gas analysts unfamiliar with the work, states the Bureau of Mines, Department of Commerce, in Bulletin 197, recently issued. Technical forms of gas-analysis apparatus and established rules for bringing a gas mixture in contact with the absorbents for different constituents are not always effective. Many samples contain absorbable constituents, such as carbon dioxide and oxygen, in extremely small quantities. The fact that oxygen may be a constant constituent of natural gas as it leaves a well has not been determined absolutely. The Bureau believes that the traces of oxygen reported in some samples were due to contamination of the samples with air.

Olefin hydrocarbons and carbon monoxide have not been identified in the samples already received at the Bureau's Pittsburgh laboratory, if the natural gas had not been mixed with artificial gas. Because higher members of the paraffin series are absorbed by fuming sulphuric acid and cuprous chloride, a natural gas that does not contain olefin hydrocarbons or carbon monoxide but does contain these higher members of the paraffin series, when treated with these solutions will undergo a reduction in volume and lead the analyst to a wrong conclusion.

Natural gas usually contains a large proportion of paraffin hydrocarbons, some samples as much as 99 per cent, so that if the paraffins are determined by explosion methods in which a small quantity of gas is used a slight error of manipulation will be multiplied 10 or 12 times in calculating results to a percentage basis. Methane is the only hydrocarbon that some natural gases contain; but if a small quantity of sample is taken for the combustion analysis, errors are magnified. The relation between the volume of carbon dioxide and the contraction produced by the combustion may indicate hydrogen, although this gas is absent. Although the error in the observed data may be small, by calculation to a percentage basis it may amount to several per cent of hydrogen. Many published analyses of natural gas are undoubtedly much in error from such causes.

The paraffin hydrocarbons that are gaseous at ordinary temperatures are methane, ethane, propane, and butane. Since the last two are liquified at ordinary temperatures by pressures below those existing in most producing wells., quantities other than small proportions carried by the permanent gases would hardly be found in natural gases coming from wells under very high pressure. On the other hand, gases drawn from wells under a partial vacuum may contain large amounts of these and higher paraffins.

STATE LINE METER HEARING DUE IN OKLAHOMA

The Oklahoma corporation commission on Tuesday, April 5, will conduct a hearing on a proposed order to require all gas and electric utilities which operate in Oklahoma, or which transport gas or electricity across the state border, to install the latest types of outdoor meters or measuring devices at the state line in order that the commission may have reliable figures on the total amount of gas or electricity imported and exported to and from other states.

HUGO, OKLA., ASKS FOR GAS

Directors of the Chamber of Commerce of Hugo, Okla., have petitioned the Lone Star Gas Company to extend a gas line to that community.

Get Out Of The Competitive Class!

—Get in on every Heating job in your territory!

Why compete with common "stove stores"? Instead of selling just one or two kinds of heating appliances—get in on *all* the business with a *complete* line. Become "Gas Heating Headquarters" in your city.

With the Pacific line you can figure on every and any job in your territory because you can always supply the exact type of heating appliance needed. As a Pacific Heating Engineer you are welcomed by every buyer because you are the only one who is unbiased and can give honest heating counsel.

When you handle Pacific you are selling the leading QUALITY line. Every appliance manufactured by Pacific is backed and guaranteed by the largest gas heating organzation in the West.

There's big money waiting for the man who gets a Pacific territory. If you want to make money in *your* district—WRITE

The Pacific Heating Engineer gets called in on the big jobs. The building trades, architects and the public know that Pacific has the quality line for **every** purpose. If **you** are representing Pacific, you get the profits.

Pacific Heating apparatus **out-sells** competition. Competitors have only one or two types of appliances, while you have **eight**—each built by an old-established, experienced firm—the largest in the West!

Heat for a two-room apartment; heat for a bungalow; heat for a twelve-story apartment; heat for schools, theatres, restaurants—every kind of heating is represented in the Pacific line. YOU, as our representative can get in on each of these jobs. Can you do it, now?

Your reputation is already made as a Pacific Heating Engineer. If you become associated with this organization, your store becomes "Gas Heating Headquarters" and people who need heat naturally come to you first. Newspaper and magazine advertising is bringing the Pacific agents before the public eye.

If you want some of this new profit in the heating appliance business. WRITE today for our interesting money-making proposition.

Pacific Gas Radiator Company

Gas Heating Headquarters

General Offices at 1732-40 West Washington St., Los Angeles, Calif.
Telephone BEacon 2190

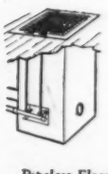
Gas-Steam Radiators

Dual Pipeless Furnaces

Wall and Fireplace Heaters

All Vented for Healthful Heat

Gas Radiators—Pressed Metal and Cast Iron


Pipeless Floor Furnaces

Unit Basement Furnace Systems

Manufacturers of Every Type of Gas Heating Appliance

Seven Gas Generator Sets Built By Us for L. A. Gas & Elect. Corp. in 1921

We Manufacture

Oil Gas Generators
Wash Boxes
Scrubbers
Purifiers
Welded Gas Lines
Heavy Plate Work

Union Tank & Pipe Co.

2801 Santa Fe Avenue Los Angeles, California
Telephone MIdland 2251

C. B. Babcock Company

We Serve

135 Bluxome Street, San Francisco, California

HOME SERVICE WORKER ADDED

Miss Ruth Van Sant is now in charge of home service for the Oklahoma Gas & Electric Company, according to J. F. Owens, vice-president and general manager of that utility. Miss Van Sant will be located in the company's general offices in Oklahoma City.

Mid-Continent *and* Western Practices Differ

(Continued from Page 30)

part analyze or test their natural gas by charcoal absorption method, which is too well known to justify detailing here. The method has the advantage of speed; it is easier to handle the equipment to and from the scene of the test, and the equipment required is usually less costly. It is claimed by those operators favoring it, that the test is more efficient and the results more accurate. Testing practice, however, is still on an empirical basis and when checking plant operation efficiencies, the plant may show 100 per cent recovery and still be operating under its highest efficiency, because the test itself may not reflect the actual condition. It is a generally acknowledged fact that the charcoal absorption test, or the compression test (or any other empirical method) will vary to a certain extent with the chemical constitution of the gas being tested. Further advancements in gas analysis or testing work will soon be forthcoming, which possibly will contribute to the development of a standard testing method and apparatus.

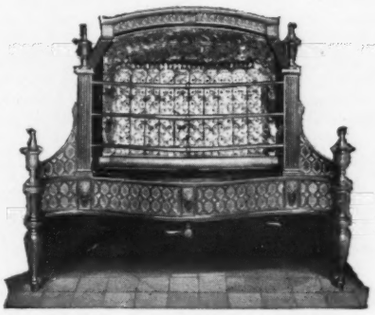
ABSORPTION OILS DIFFER

Another instance of difference in operating procedure in the manufacture of natural gasoline is indicated in the type of absorption oil prevalently employed on the West Coast and in the Mid-Continent area. The West Coast manufacturer, early in the development of the industry, found that Western refiners could not profitably arrange their distillation or fractionation equipment for the purpose of producing a small amount of a very narrow "cut" which would be a more or less highly specialized distillate known as "absorption oil." On the other hand, freight rates from the Mid-Continent area, where absorption oil was, and is, a somewhat common product with refiners, made its importation and use too costly for general practices. This condition has resulted in the employment of, practically speaking, whatever distillate of about the same type as heavy kerosene, or light gas oil, that the refiner has available. Since the preparation of absorption oil did not fit into the West Coast refiners' scheme of things,—the absorption plant operators proceeded to use what he had. The result was greater economy, at least, of operation, for the low or heavy distillates are not expensive. The oil is untreated, there are no specifications such as "emulsion," "Doctor," "corrosion," "color," etc. to be contended with,—only a sufficiently high initial boiling point to satisfy the needs of the gasoline manufacturer. The high efficiencies, the smoothness, and the uninterrupted operation of the many gasoline plants in this area, make it appear that the use of a highly specialized distillate is not essential to efficient operation.

The Mid-Continent operator, however, for the most part, calls for a specially prepared absorption oil of good color, odor, generally Doctor sweet, a rigid emulsion test sometimes being included, and occasionally the oil specified must be non-corrosive to copper.

Humphrey Radiantfire

Leadership In Design



No. 112
COLONIAL

No. 115-A
ADAM

No. 120-A
QUEEN ANNE

Never has the vogue of period architecture for home construction been more marked than today. All over the country, home builders are showing their preferences for Spanish, Italian, English, Norman, Swiss architectural styles—and always the architecture is distinctive.

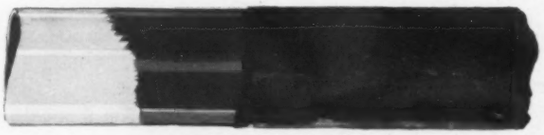
Inside these homes, the furnishings are equally distinctive, equally in keeping. Humphrey Radiantfire has capitalized this vogue by presenting an array of handsome and authentic period designs from which any home owner can find just the type suited to his home, whatever its architecture. The homeowner's answer is a decided preference for the Humphrey Radiantfire. Are you doing all the business you could be doing in Period Models of the Radiantfire?

The HUMPHREY
Radiantfire
REGISTERED TRADE MARK

Manufactured by
General Gas Light Company
Kalamazoo, Mich.

Pacific Coast Representative
C. B. Babcock
135 Bluxome Street, San Francisco

No Paper-No Felt



Biturine Enamel Primer Pipe

Biturine Enamel is, from every standpoint, the most economical coating for pipe lines, because—

—It is a complete coating in itself; requiring no wrapping.

—It has a record of more than 16 years underground in highly corrosive soils.

—It is easily and quickly applied.

—It is certain to cost less per year.

HILL, HUBBELL & COMPANY

Manufacturers of
Highest Grade Oil Industry Paints and Pipe Line Coatings
Factories at SAN FRANCISCO and TULSA

District Offices:

331 W. Eleventh St. LOS ANGELES	1006 Washington Ave. HOUSTON	15 Moore St. NEW YORK
2412 First Ave. S. SEATTLE	51 First St. PORTLAND	600 E. Lombard St. BALTIMORE

Electric Weld Products---

The Wood Automatic Storage Gas Water Heater

The Standard Combination Storage Gas Water Heater

Electric Weld Range Boilers and Storage Tanks

Made and Guaranteed by

John Wood Manufacturing Co.

2437 ENTERPRISE STREET **LOS ANGELES, CALIF.**

Probably the most important advantage secured by the use of this special oil (for which the operators pay a correspondingly special price) is the factor of cleanliness. This difference of practice concerning absorption oil is due to existing conditions with the refiners of petroleum in the two areas. One group of refiners finds it profitable to extract it from the crude, while another finds that the crude does not yield it as easily, nor in sufficient quantities to justify the re-arrangement of equipment for its preparation. There seems to be no markedly appreciable difference in results secured by the gasoline plant operations, so far as actual plant efficiency is concerned.

HANDLING THE GASOLINE

General practice in regard to the handling of the finished product, gasoline, differs with the two manufacturing districts under discussion. The Mid-Continent operator of necessity must ship the greater portion of his product by tank car to the consumer. His storage facilities must, therefore, be larger and gasoline in storage is susceptible to evaporation losses. Handling for shipment incurs additional losses as does transportation itself, as well as unloading. These avenues to loss are carefully guarded, and specially developed equipment for storage and loading reduces evaporation to a minimum.

Natural gasoline on the West Coast is very rarely handled in this manner. The product is stored under pressures ranging from 10 to 30 pounds. It is seldom loaded in tank cars. Virtually all of the gasoline producing companies have pipe line connections with their point of shipment, and the production of the great majority of gasoline plants is pumped direct to the tanks of the refiner buying the production every day. Storage of natural gasoline in plants of this latter district has been reduced to an almost negligible quantity by reason of the fact that the production of the plant is moved from its tanks each day. As shown by the Department of Commerce in its monthly reports the average storage of finished natural gasoline for all of the plants in California usually amounts to but the production of one day's operations. This practice of daily shipment through pipe lines carries with it the advantage of minimized evaporation losses at the plant. Some absorption plants operate with losses as low as one per cent.

DIFFERENCE IN PRODUCTS

Another difference in operation lies in the type of product manufactured. The California operators arrange specifications with their individual markets on what might be termed long time contracts. The specifications are very flexible and usually take the form of limitations imposed upon the manufacturer. Gasoline generally, on the West Coast has the upper limit, or end point specification of 370 to 395 degress F. by Bureau of Mines distillation. Little is said of initial boiling point. Gravity may range from 72 to 85 degrees A. P. I. The Doctor test is seldom regarded as important, and color is taken for granted.

The Mid-continent operator however has his various grades. Grade Double A; Grade A; Grade Double B; Grade B; and Grade C are among those which are prepared for the market, and each grade carries with it a slight difference in price or value.

Oklahoma specifications for these various grades are given below. North Louisiana and North Texas are similar.

Grade AA	80—87.9	gravity 375 E.P.	recovery 90%
Grade A	72—79.9	gravity 375 E.P.	recovery 90%
Grade BB	84—92	gravity 375 E.P.	recovery 90%
Grade B	76—83.9	gravity 375 E.P.	recovery 85%
Grade C	80—90	gravity 375 E.P.	recovery 78%

POTTER Heating

For many years POTTER Engineers have pioneered the way in the advancement of modern Gas Heating Systems. They have developed Gas Heating to such a degree of perfection that today, POTTER Products have become a standard of comparison wherever dependable, safe, economical and healthful gas heating is discussed.

OUR BEST ASSET

The tens of thousands of satisfied customers that our Organization has made through POTTER Gas Heating installations, is a JUST tribute to a satisfactory product—a gratification to conscientious effort.

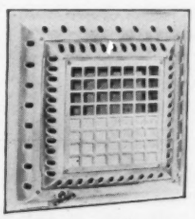
THERE ARE MANY REASONS WHY IT IS BETTER TO INSTALL POTTER SYSTEMS

"POTTER" Vented Radiators

Only POTTER has these 7 POTTER Features

(Cast Iron and Steel-Made)

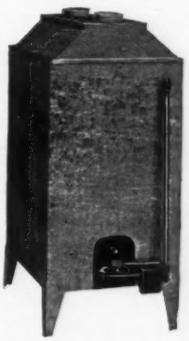
1. Condensation abolished. This does away with corrosion. Many years are added to the life of the Radiator.
2. Triple Circulation. The heat goes into the room, not up the flue.
3. Uniform warmth distribution. The air is never "cooked."
4. Quick heat. No other radiator heats so quickly as the light, efficient POTTER Steel-Made.
5. Aristocratic appearance. The POTTER Cast Iron Radiator is selected for the finest and largest homes.
6. Totally odorless always.
7. Not expensive.



"COLE" Floor and Wall Heaters

Made in heavy solid cast aluminum.

COLE is the only furnace manufactured that can be installed on either the first or second floor.



"MAGIC WAY" FURNACES

"MAGIC WAY" was the first, and has always been considered the leading Unit System of heating.

The principle of Unit Heating of modern buildings, brought to its present state of refinement through the study and efforts of this Organization, is based on the principle of an individual furnace or heater for each room or group of rooms to be heated.

This type of installation allows accurate temperature control in each room, regardless of the demand in other sections of the home.

POTTER quantity production now makes "MAGIC WAY" with electric controls, available to anyone who desires a gas furnace system.

The same features that make these well known POTTER-made appliances favorites with home builders and home owners, make them popular with churches, schools, theatres, auditoriums and factories.

The low cost of adequate heating by means of "MAGIC WAY" Vented Furnaces of either the Unit or Central Plant type, will be a revelation.

"MAGIC WAY" VALVES

By merely pressing a button, the temperature of any room may be regulated. This valve not only turns the heat on but it regulates the heat to suit your exact wants.

"MAGIC WAY" Floor Furnace

When the furnace type of heat is desired at low cost or when a basement is not available, use "Magic Way" Vented Floor Furnaces.

Potter Heating Includes:

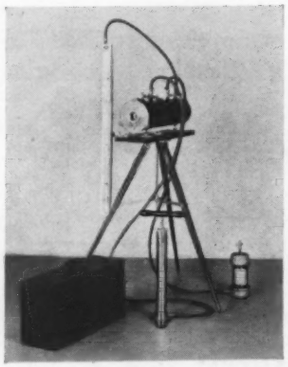
"MAGIC WAY" UNIT FURNACES
"POTTER" GAS RADIATORS
"STEEL-MADE" GAS RADIATORS
"COLE" FLOOR AND WALL FURNACES

There Is a **POTTER System** for Every Need

POTTER RADIATOR CORPORATION

San Francisco—Oakland—Los Angeles—San Diego

Specialties
FOR THE
Gasoline Plant



THE AC-ME GRAVITY BALANCE

Furnished Completely Equipped. Powerful Mechanism, Ruggedly Constructed. Accurate. Operated and Transported without Opening Balance.

Write for Bulletin No. 3

THE AC-ME LOADING DOME COVER

Cast Aluminum, Light in Weight, Large unbreakable Lenses, Low in Price.

Write for Bulletin No. 6

THE AC-ME VAPOR TENSION BOMB

Completely Self Contained, Gauge and Thermometer Not Removed, No Leakage, Automatically Drains 10%. Thermometer Immersed in Gasoline.

Write for Bulletin No. 5

THE AC-ME CALCULATOR

Gives Extension on Orifice Meter Charts with one setting. Charts Directly Read in Cu. Ft. An Accurate Time Saver. Simple to operate.

Write for Bulletin No. 1A

For Pocket Calculator
Write for Bulletin No. 1B

THE AC-ME CO.

Specialties for
AC-curate ME-asurement
3408 Main Street
DALLAS, TEXAS

NATURAL GAS GASOLINE OPERATIONS

Compiled by E. T. Knudsen

Department of Commerce, Bureau of Mines, Division of Mineral Resources and Statistics

ONE HUNDRED and forty-nine natural gas gasoline plants with a daily indicated capacity of 1,372,775 thousand cubic feet, report a recovery of 36,304,-814 gallons of natural gas gasoline from 26,-464,660 thousand cubic feet of gas treated in February. This is a decrease of 100 barrels in daily average production.

Utilization of natural-gas gasoline amounted to 773,340 barrels, a decrease under January of 136,542 barrels. Daily average utilization of 27,619 barrels was 3,252 barrels less than daily average production of 30,871 barrels.

Stocks of natural-gas gasoline at the end of February amounted to 459,695 barrels of which 37,556 barrels were reported by natural-gas gasoline plant operators and 422,-139 barrels by refinery operators. This is an increase of 91,060 barrels over January stocks. This stock figure of 459,695 barrels is approximately sixteen and one-half days supply at the current rate of consumption.

Production of gasoline during the month of February amounted to 4,526,755 barrels, a daily average of 161,670 barrels. This is a decrease of 382,242 barrels or 7.79 per cent under the January output and an increase of 1,225,016 barrels or 37.10 per cent over the output of February, 1926.

Of the gasoline produced 4,500 barrels were reported as finished gasoline produced by natural-gas gasoline plant operators. Production of gasoline from Cracking Processes decreased in February to 309,708 barrels.

Stocks of gasoline show an increase of 363,983 barrels during February and at the end of the month amounted to 12,656,542 barrels. This stock figure includes 112 barrels of finished gasoline reported by natural-gas gasoline plant operators.

CALIFORNIA NATURAL-GAS GASOLINE PRODUCTION DISTRIBUTION AND STOCKS

February, 1927

PRODUCTION

Type of Plant	*Gas Treated M. C. F.*	*Natural-gas Gasoline Produced Gallons*	*Gasoline Recovery per MCF Gas Treated*
Oil Absorption	11,662,639	16,661,183	1.428 Gal.
Compressor	288,674	478,627	1.658 "
Combination Comp. and Oil Absorption	8,214,702	13,144,835	1.600 "
Combination Oil and Charcoal Absorption	5,182,242	5,858,454	1.130 "
Charcoal Absorption	1,116,403	140,983	.126 "
Drip	.....	20,732	..... "
TOTALS	26,464,660	36,304,814	1.372
Finished Gasoline produced at plants			4,500 Bbls.

DISTRIBUTION				
Stocks First of Month	.....	Bbls.	368,635	Bbls.
Production during Month	.....	"	864,400	"
Quantity mixed with crude or unfinished oils	314,588	"		
Used in Blending at Refineries	437,122	"		
Stocks end of month	459,695	"		
Used at Plants, Shortage and Evaporation losses	13,797	"		
Balance	7,833	"		
TOTALS	1,233,035	Bbls.	1,233,035	Bbls.
STOCKS				
Natural-gas gasoline held by Natural-gas Gasoline Plant Operators	1,577,371	Gal. or	37,556	Bbls.
Natural-gas gasoline held by Refiners	17,729,838	" "	422,139	"
TOTALS	19,307,209	" "	459,695	"
Finished Gasoline (Motor Fuel) held by Natural-Gas Gasoline Plant Operators			112	Barrels

GAS FLAME TEACHES DEAF AND DUMB THE ALPHABET

Coming as a by-product of recent discoveries whereby a gas flame may be used to soften the transmit sounds in a phonograph, we now learn of an ordinary gas flame being successfully used to teach deaf and dumb children the sound of the letters of the alphabet.

The new method consists in showing each child how he or she can make the gas flame jump and flicker at a varying rate with the current of air produced in speaking the different letters. By producing the appropriate change in the flame, the child learns the sound of the letter spoken. A report on the gas-flame method says that the average pupil can learn the letters of the aphabet in about three months.

Vibrations from a diaphragm transmitted by gas flames within the sound-box of a phonograph have been found to produce sounds of singular purity. When a record is played, the pulsations of the flames are clearly visible, and when the gas is turned down a flattening of tone results.

COURSE IN FUEL ENGINEERING

The Mechanical Engineering Department of the Towne Scientific School of the University of Pennsylvania announces the opening of a new course in Fuel Engineering on September 30, 1927. This course leads to a degree of Master of Science in Fuel Engineering.

REGIONAL SAFETY CONFERENCE

Under the auspices of the National Safety Council, there will be held at Kansas City, Mo., April 13 to 15, the Central Western Conference. Special public utility safety sessions have been arranged.

TAPPAN INSULATED OVEN GAS RANGE

"THE RANGE WITH ROUNDED CORNERS"

The Result of 45 Years of Successful Stove Building

The proudest achievement of TAPPAN is the Insulated Oven Gas Range—the result of 45 years of successful stove building. A unique and truly wonderful range, its oven is thoroughly insulated with 25 pounds of mineral wool, the best insulation known for this purpose. Yet it is ventilated perfectly.

The TAPPAN Insulated Oven Gas Range saves fuel, makes baking better and easier. But the TAPPAN also has every other modern gas range feature—an oven heat regulator, utility drawer, stainless solid top, and so on. Probably one of the reasons for the increasing popularity of the TAPPAN Insulated Oven Gas Range is that it gives your customer a really superior gas range—at no greater cost than the ordinary types.

For franchise information communicate with

TAPPAN STOVE COMPANY

Pacific Coast Office

665 Howard Street—San Francisco

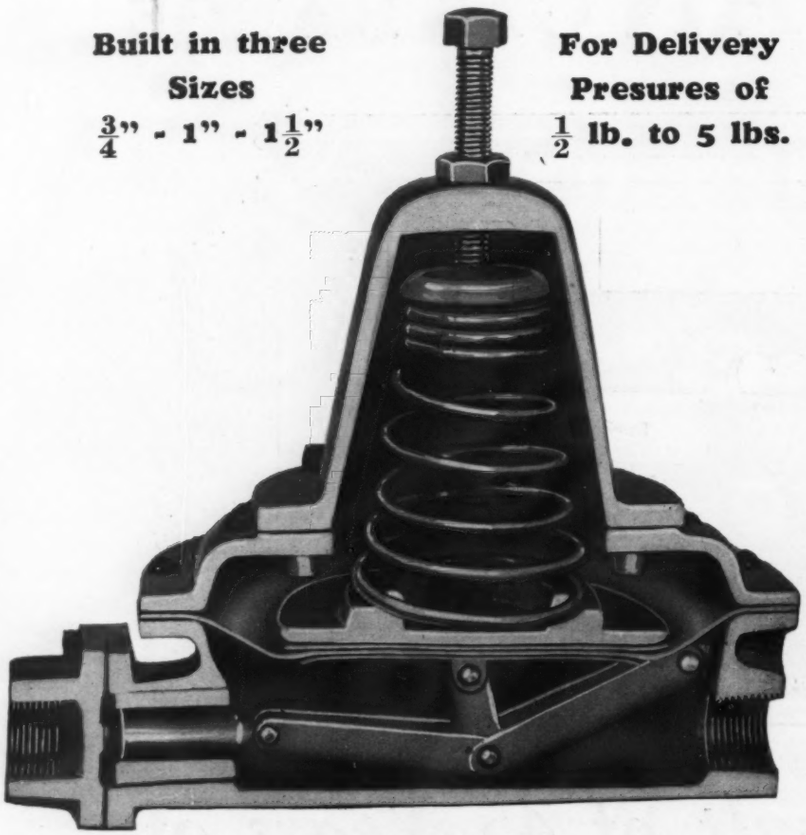
H. R. BASFORD COMPANY
Direct Factory Representatives
Northern California—Nevada—Hawaii
665 Howard St.—San Francisco

H. R. MAYER
Direct Factory Representative
Southern California—Arizona
1001 East First St.—Los Angeles

The Reliance High Pressure Regulator

Built in three Sizes
$\frac{3}{4}$" - 1" - 1$\frac{1}{2}$"

For Delivery Presures of
$\frac{1}{2}$ lb. to 5 lbs.



Particularly suitable for Industrial Plants where positive lockup, close regulation and large capacities are desired. Prices upon application

Reliance Manufacturing Co.

PASADENA, CALIFORNIA

Eastern Representative	Northwestern Representative	Mid-Continent Representative
Isbell Porter Co.	Northwest Gas & Electric Equipment Co.	Westcott & Greis
Newark, N. J.	Portland, Oregon	Tulsa, Okla., Dallas, Texas

W P & S

DESIGNERS, FABRICATORS & ERECTORS OF PRODUCTS OF **STEEL**

Investigate WESTERN Hi-Pressure Unit Gas Holders

WESTERN PIPE & STEEL COMPANY OF CALIFORNIA
5717 Santa Fe Ave. LOS ANGELES — 444 Market Street SAN FRANCISCO
FACTORIES: LOS ANGELES · SOUTH SAN FRANCISCO · FRESNO · PHOENIX · TAFT

W P & S

Installation, Adjustment *of* Oven Heat Control

(Continued from Page 29)

one complete turn to the left. This will allow only enough gas to the burner to keep it lighted. Then turn operating dial of the control to the 250° mark. *(See Fig. 5).* Lift up indicator finger with screw driver enough to allow adjusting screw boss to pass under. Light the oven burner and turn the dial toward you slowly until the oven flame changes from a long flame to a small flame. If the control is properly calibrated, the change of flame should occur when the word "pop-overs" (for manufacturing gas) or "tarts" (for natural gas) is directly under the indicator finger. Should this change of flame occur at any other point, loosen adjusting screw holding dial strip in place and by holding the wheel firm, slide dial strip until "pop-overs" or "tarts," as the case may be, is directly under the indicator finger. Then tighten adjusting screw on dial strip, turn operating wheel back to first position and clamp down indicator finger.

This cold method must be done quickly, because if the oven is allowed to heat up before checking is done, an incorrect reading will result.

2. *Hot Method.* Adjust by-pass first, as in cold method. Place Taylor Oven Thermometer on middle rack about three inches from front of oven. Light oven burner and turn operating dial to 350° mark. After oven flame burner cuts down, allow about 15 minutes (or as soon as you can change the size of oven burner flame by moving the dial from 350° to 355°) before you take reading of the Taylor Thermometer. If there is a difference between the temperature reading of the temperature on the dial and the Taylor Thermometer, correct the Wilcolator as follows: Loosen dial strip, set screw, and slide dial strip on the wheel until the reading of the dial strip under the indicator finger agrees with the Taylor Thermometer. Then tighten set screw.

To change the calibration of the external type Wilcolator, the above instructions do not apply. Instead of moving the dial strip, the valve seat itself is raised or lowered.

HONOLULU GAS CO. EARNINGS

The Honolulu Gas Co., Ltd., serving gas in Honolulu, T. H., reports earnings of $119,451.52 for the year ending December, 1926. This represents 14.72 per cent on the company's outstanding $750,000 capital stock. During the year, 621 new consumers were added.

HOUSTON DISTRICT GAS USE SHOWS BIG GAIN

A tremendous gain in the use of natural gas in the Houston, Texas, district has been noted recently. The district is now using 150,000,000 cubic feet daily and extensions are planned for another 100,000,000 cubic feet daily.

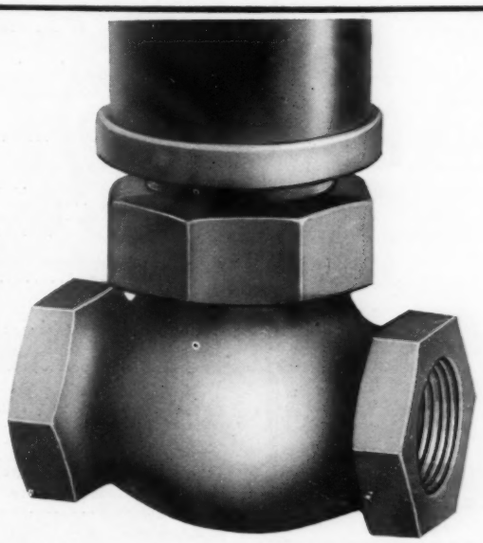
GAS IN CHICKEN INDUSTRY

Gas for chicken hatcheries and brooders is becoming the popular fuel. The vocational department of the high school at Winfield, Kan., recently equipped its incubators for gas heat.

ALAMOSA GRANTS FRANCHISE

At a special election held in March, the town of Alamosa, Colo., granted a natural gas franchise to the San Luis Valley Public Service Company.

DADY *Magnetic* Gas Valve



The Dady Magnetic Gas Valve is a snap action, electrically actuated valve with non-corrosive monel metal poppet. Operates on 12 volts. No expensive wiring needed in installation. No current is consumed except while opening or closing. Operating mechanism instantly interchangeable. Seat can be reground. Has no packing to leak or stick. Electrical parts completely insulated from body. Has full lift and passes gas with less pressure drop than other makes. Made in all sizes from ⅜ in. to 1 in. Is successfully used as pilot valve to control larger valves.

"Yes, It's Automatic"

....must be your answer to the query, "Is it automatic?" about your appliance. If it is to measure up to modern standards of convenience and economy it must be automatically controlled. Gas furnaces, water heaters, bake ovens, dryers, or any other gas burning appliance, large or small, can be automatically controlled with DADY Magnetic Gas Valves. No structural alterations are necessary—our sensitive electrical thermostats provide the finest of regulation.

We manufacture thermostats and complete equipment for the automatic control of gas, steam, hot water, air, oil, or electric heating systems or for refrigeration control.

L. R. TEEPLE COMPANY

formerly TEPCO Manufacturing Company

540 East 9th Street · Portland, Oregon

Sole manufacturers under license, DADY patents

TEEPLE

TEEPLE TEMPERATURE *Controls*

Pacific Coast Distributors for Honeywell Heating Specialties Co.

Are you including
Minneapolis
Controls in
every heating
installation?

The "MINNEAPOLIS" HEAT REGULATOR

The heart of the heating plant

Minneapolis is the proven control. National advertising makes it easy to sell. You are giving your customer the best there is and making additional profit for yourself. This means more satisfaction all around.

Arthur F. Erickson Co.

Pacific Coast Distributors

SELLING BUILDING
PORTLAND, OREGON

Branches or Dealer stocks in principal Pacific Coast cities

−330
+3000

We have a reliable instrument for temperature indicating, recording, or controlling within the above limits of degrees fahrenheit. Centigrade within corresponding limits.

SALES ENGINEERS
for
Engelhard Pyrometers, Foxboro Recorders, Moeller Mercury Thermometers, Ellison Draft Gages, Paracoil Steam Traps, Locke Regulators, Precision Machine Counters.

JENSEN
INSTRUMENT CO.
443 S. San Pedro Street
Los Angeles
950 Parker Street
Berkeley, Calif.

Natural Gasoline Plants *of the* West

The list of natural gasoline plants printed below was largely compiled from returns to a questionnaire sent to operators by WESTERN GAS. All of the major companies operating natural gasoline plants in California and Wyoming will be found represented, as well as a number of smaller companies. Gas and gasoline capacities are both given for the various plants, and for most of them the absorption plant pressures are also published.

Name and location of plant	Type	Daily gas capacity (M.C.F.)	Daily gasoline capacity (gallons)	Status of plant	Absorption plant pressure (Pounds)
California Gasoline Co.					
Signal Hill No. 1	Abs.	4,000	16,000	Op.	35
Signal Hill No. 2	Abs.	7,000	16,000	Op.	35
Signal Hill No. 3	Abs.	7,000	16,000	Op.	35
Athens No. 4	Abs.	7,000	16,000	Op.	35
Long Beach No. 6	Abs.	6,000	16,000	Op.	35
Signal Hill No. 7	Abs.	6,500	16,000	Op.	35
Santa Fe Springs No. 9	Abs.	6,500	16,000	Op.	35
Huntington Beach No. 10	Abs.	3,500	15,000	Op.	35
Montebello No. 11	Abs.	4,000	5,000	Op.	35
Santa Paula No. 12	Comp.	7,600	15,000	Op.	280
Fillmore No. 13	Abs.	1,700	25,000	Op.	30
Huntington Beach No. 16	Abs.	8,000	20,000	Op.	35
Huntington Beach No. 15	Booster				
General Petroleum Corp.					
Producers, Athens	Abs.	8,000	15,000	Op.	25
Rosecrans, Athens	Comb.	2,000	2,700	Op.	30
Springs, Santa Fe Springs	Comb.	15,000	30,000	Op.	25
Sterling, Signal Hill	Comb.	6,000	15,000	Op.	25
Tonner, Brea	Comb.	8,000	15,000	Op.	25
Ventura	Comb.	20,000	20,000	Op.	40
Vermont, Athens	Comb.	10,000	15,000	S.D.	30
Gilmore Gasoline Company					
Signal Hill No. 1	Abs.	10,000	10,000	Op.	30
Holly Oil Company					
Huntington Beach	Comb.	4,000	12,000	Op.	225
Lomita Gasoline Company					
Signal Hill	Abs.	10,000	20,000	Op.	35
Lovell Gasoline Corp.					
Plant No. 2 (Taft)	Abs.	2,000	3,000	Op.	
Plant No. 3 (Torrance)	Abs.	6,000	6,000	Op.	
Plant No. 4 (Taft)	Abs.	6,000	15,000	Op.	
Plant No. 6 (Taft)	Abs.	2,500	3,000	Op.	
Plant No. 7 (Maricopa)	Abs.	2,500	2,000	Op.	
Mutual Gasoline Company					
Signal Hill	Char.	10,000	12,500		25
Norwalk Company					
Santa Fe Springs	Comb.	20,000	35,000	Op.	23
Pan American Petroleum Company					
Crampton No. 3, Elk Hills, Taft	Comb.	15,000	12,000	Op.	300
Torrance	Comb.	2,000	4,000	Op.	30
Signal Hill	Comb.	4,000	10,000	Op.	60
Section 34 Elk Hills	Booster	7,000		Op.	
Petroleum Securities Company					
Rubel gas plant, Baldwin Hills	Comb.	11,000	8,000	Op.	30
Ventura	Comb.	2,000	2,000	Op.	30
Naples No. 1	Comb.	5,000	15,000	Bldg.	30
Naples No. 2	Abs.	2,000	4,000	Op.	30
Richfield Oil Company of Calif. (Parent operating company for Signal Gasoline Company)					
Athens	Comb.	6,000	10,000	Op.	30
Bixby, (Seal Beach)	Abs.	1,000	500	S.D.	30
Calidon (Fellows)	Comb.	4,500	2,500	Op.	30
Denni-Jones (Signal Hill)	Comb.	3,000	5,000	Op.	30
Hass-Cerritos (Signal Hill)	Comb.	6,000	8,000	Op.	30
Dominguez	Abs.				
Huntington (Huntington Beach)	Comb.	12,000	15,000	Op.	30
Los Cerritos (Long Beach)	Comb.	3,000	8,000	Op.	30
M & T (Maricopa)	Comb.	1,000	2,500	Op.	10
Maricopa (Maricopa)	Comb.	3,000	3,000	Op.	30
Rosecrans (Rosecrans)	Comb.	8,000	12,000	Op.	30
Seal Beach	Abs.	12,000	20,000	Op.	30
Selover (Seal Beach)	Abs.	3,000	2,500	S.D.	30
Surety (Huntington Beach)	Comb.	6,000	8,000	Op.	30
Santa Fe Springs	Comb.				
Cerritos (Signal Hill)	Booster	1,250			
Shell Company of California					
Brea Canyon	Abs.	24,000	40,000	Op.	28
Dominguez	Abs.	15,000	32,000	Op.	28
Dominguez	Char.	15,000	7,500	Op.	28
Inglewood	Abs.	6,000	10,000	Op.	28
Long Beach	Abs.	30,000	60,000	Op.	28
Long Beach	Char.	30,000	7,500	Op.	28
Ventura	Abs.	98,000	130,000	Op.	28
Ventura	Char.	15,000	5,000	Op.	28
Santa Maria	Abs.	3,000	4,000	Op.	28
Coalinga	Abs.	4,000	4,000	Op.	28
Signal Gasoline Company, Inc.					
Signal Hill No. 1	Abs.	8,000	15,000	Op.	
Signal Hill No. 2	Abs.	8,000	15,000	Op.	
Long Beach No. 5	Abs.	6,000	11,000	Op.	
Long Beach No. 6	Abs.	6,000	8,000	Op.	
Standard Gasoline Company					
36-R Plant	Abs.	5,500	5,500	Op.	300
1-C Plant	Abs.	6,500	30,000	Op.	100
2-C Plant	Booster for 1-C	6,000	inc. with 1-C	Op.	100
16-D Plant	Abs.	5,000	10,000	Op.	100
9-D Plant	Booster for 7-D	5,000	inc. with 7-D	Op.	100
7-D Plant	Abs.	4,500	25,000	Op.	100

Gas Companies all over the country are ordering

HOTZONE

Water Heaters by the carload

They are creating new records every month. An appliance of proven worth sold at a price and on terms that make every metered home a prospect, and the resulting good will of satisfied users is the answer. There is no sound reason why *you* should not be selling Hotzones.

Write at once for information.

WELSBACH COMPANY
GLOUCESTER, N. J.

San Francisco Office: 863-865 Mission Street
Member Pacific Coast Gas Association

Member Natural Gas Association ***Member American Gas Association***

Keep Your Cooling Towers Free of Algae

MAAS FUNGUS REMOVER does not precipitate with any kind of water—a distinct advantage over most fungicides.

MAAS FUNGUS REMOVER was developed through extensive research and experimental work in the Maas Laboratories. Exacting tests have proved it unusually effective in the removal of the heaviest algae.

Manufactured by

A R M M

Arthur R. Maas

Chemist

308 East Eighth St.
Los Angeles, California

SOUTH CHESTER STEEL PIPE

Excels for Gas Service

The unusual care given to accuracy of diameter and welding qualities, makes Chester Pipe a favorite for gas lines.

SOUTH CHESTER TUBE CO.
Chester, Pa.

Name and location of plant	Type	Daily gas capacity (M.C.F.)	Daily gasoline capacity (gallons)	Status of plant	Absorption plant pressure (Pounds)
Standard Gasoline Company					
23-D Plant	Abs.	28,000	3,000	Op.	400
35-S Plant	Abs.	4,000	5,000	Op.	100
31-B Plant	Abs.	4,500	6,000	Op.	50
29-G Plant	Abs.	5,000	13,000	Op.	100
33-G Plant	Abs.	2,000	inc. with 29-G	Op.	100
19-G Plant	Abs.	5,000	11,000	Op.	100
31-E Plant	Abs.	5,000	6,500	Op.	60
Kern No. 2 (Wheeler Ridge)		800	500	Op.	60
Huntington Beach No. 1	Abs.	6,500	15,000	Op.	30
Huntington Beach No. 2	Abs.	6,000	11,000	Op.	30
Huntington Beach No. 3	Abs.	28,000	40,000	Op.	60
Huntington Beach No. 4	Abs.	13,000	30,000	Op.	300
Huntington Beach No. 7	Abs.	7,500	17,000	Op.	60
Seal Beach No. 1	Abs.	12,000	14,000	Op.	C0
Santa Fe Springs No. 2	Abs.	6,000	18,000	Op.	30
Santa Fe Springs No. 3	Abs.	19,000	1,500	Op.	150
Santa Fe Springs No. 4	Booster	1,000		Op.	
Santa Fe Springs No. 5	Booster	600		Op.	
Santa Fe Springs No. 6	Abs.	3,000	20,000	Op.	300
Long Beach No. 1	Abs.	2,500	6,500	Op.	30
Long Beach No. 2	Abs.	3,000	5,500	Op.	30
Long Beach No. 3	Abs.	9,000	2,500	Op.	200
Athens	Abs.	2,500	4,000	Op.	30
Dominguez	Abs.	5,000	8,000	Op.	30
Torrance No. 2	Abs.	1,800	2,500	Op.	60
Torrance No. 3	Abs.	1,600	1,600	Op.	30
Inglewood No. 1	Abs.	4,500	3,000	Op.	30
Inglewood No. 2	Abs.	3,800	4,000	Op.	30
Inglewood No. 3	Abs.	11,000	8,000	Op.	300
Murphy-Coyote No. 2	Abs.	9,000	25,000	Op.	300
Montebello No. 1 and 2	Abs.	8,000	4,000	Op.	200
Kraemer	Abs.	8,000	20,000	Op.	300
Brea	Abs.	900	4,500	Op.	40
Newhall		200	900	Op.	40
Ventura—No. 1 and 3—No. 1 Abs., No. 2 Char.		17,000	13,000	Op.	40
Ventura No. 2	Abs.	26,000	21,000	Op.	40
Ventura No. 4	Abs.	35,000	33,000	Op.	40
Union Oil Company of California					
Stearns No. 2 (Coyote Hills)	Abs.	3,500		Op.	
Stearns No. 3 (Coyote Hills)	Abs.	10,000		Op.	
Dominguez (Hellman Lease)	Abs.	28,500	44,000	Op.	
Copeland plant, Huntington Beach	Abs.	5,000	7,800	Op.	
Morse plant, Richfield field	Abs.	12,000	18,000	Op.	
Rosecrans (Athens)	Abs.	17,000	26,000	Op.	
Bell plant, Santa Fe Springs	Abs.	12,000	12,000	Op.	
Newlove plant (Santa Maria)	Abs.	12,000		Op.	
Midwest Refining Company, Casper					
Salt Creek	Comp.	40,000	80,000	Op.	
New York Oil Company, Casper					
Teapot Dome	Comp.	5,500	1,800	Op.	
Ohio Oil Company, Casper					
Grass Creek Field	Comp.	1,000		Op.	
Salt Creek Field	Abs.	10,000			
Leo plant, Lance Creek field	Abs.	8,000		Op.	
Producers and Refiners Corp.					
Parco. Casper	Abs.	40,000	6,000	Op.	75

GAS REFRIGERATORS IN CARLOAD LOTS FOR THE WEST

Southern California Gas Company late in March received what is believed to be the first car-load shipment of gas-fired refrigerators to be consigned to a Pacific Coast point. The car contained 39 Electrolux-Servel refrigerators, which will go to the 24 display rooms in Southern California Gas Company district offices. Another car of refrigerators, says C. M. Grow, new business manager for the utility, is on the way, and should arrive about the middle of April. The company will actively merchandise refrigerators as fast as shipments are received.

SUMMER COURSE IN PUBLIC UTILITY MANAGEMENT

A summer course in public utility management and economics primarily for public utility executives will be offered in the Harvard Summer School during the coming summer, under Philip Cabot, in charge of public utility work in the Harvard Business School.

A. G. A. WILL HAVE BOOK ON SALESMANSHIP

Elmer E. Ferris, professor of salesmanship, New York University, New York, N. Y., has been engaged by the American Gas Association to write a book on salesmanship for use by men engaged in selling gas for industrial and factory heating operations.

COMPANY WOULD ABANDON GAS PLANTS IN TWO TOWNS

On the grounds that the company is losing money the John I. Beggs Estate operating at Pryor and Choteau, Okla., has petitioned the state corporation commission for permission to discontinue its gas plants in those two towns. The petition is to be heard on April 6. The city of Pryor will ask continuance on the grounds that efficient management of the company would make it a paying organization.

PITTSBURGH EQUITABLE METER CO. APPOINTS J. H. HILL

J. H. Hill of Los Angeles has been appointed district manager for the Pittsburgh Equitable Meter Co. of Pittsburgh, Pa. for the California and Arizona districts. Mr. Hill for many years has been the Southern California representative for the Pittsburgh Meter Co. and the Chaplin-Fulton Manufacturing Co., also of Pittsburgh.

The appointment of Mr. Hill was announced by L. A. Dixon, assistant to the president of the Pittsburgh-Equitable Meter Co., during his visit on the Pacific Coast early in March. Mr. Dixon expressed himself as being much impressed by the progress of the gas industry in the West. His company, he said, will be well represented at the annual P.C.G.A. convention, to be held this year in September, at Santa Cruz, Calif.

JEWEL STOVES AND FURNACES
DETROIT STOVE WORKS
LARGEST STOVE PLANT IN THE WORLD

JEWETT

MAGEE

Monarch MALLEABLE

YORK ARENDROTH

ERIEZ

STOVES SUMMIT RANGES FURNACES

PEERLESS

T TAPPAN

SPARK

RED CROSS RANGES & FURNACES

Crawford Gas Ranges

ANDES

Paramount MALLEABLE

THERE are 3 outstanding features in the Wilcolator Oven Heat Control that recommend it strongly to the retailer in gas ranges and commercial representatives of gas utility corporations. These are:

1. Wilcolator equipped ranges give more value per dollar of price.
2. Wilcolator equipped ranges increase the consumption of gas through greater use.
3. Wilcolator equipped ranges will stimulate replacement business.

Send requests for more specific data to Dept. 4 at the address below. No obligation is involved.

THE WILCOLATOR COMPANY

17-23 Nevada Street **Newark, N. J.**

WILCOLATOR

OVEN HEAT CONTROL

The One Sure Way To Stop Joint Leaks

Makes joints 100% tight — absolutely leakproof where all other methods fail.

Throughout the gas industry this non-corrosive, greaseless compound is being used to end all trouble from leaky joints.

Due to its scientific preparation and graphite base, this paste is **oil, acid and gasoline proof.** It is soluble only in water. Of paste-like consistency, it is **easily spread** on pipe joints, fittings, flanges, flange unions, and every place where a leakproof joint is desired. **It expands under heat, filling every crack and crevice—then carbonizes.**

It renders joints not only leakproof, but easy to take apart if desired.

Key Graphite Paste will guarantee you a genuine service in every Department, from the Garage to the Power Plant.

Put up in any size container, from a one-pound can to a five hundred pound drum.

E. A. Key Company, Inc.
1431 Santa Fe Avenue
Los Angeles

KEY Graphite Paste

PIPE

Montague-Wade Safety Water-Tube Boiler

Guaranteed more pounds pressure, horse-power for horse-power. Gets up full head of staem quicker—won't blow up—can be cleaned quickly—easily.
1 to 20 h. p. and larger.
Full details and prices upon application.

Montague pipe and other steel products have stood the test of time. You'll find it a good investment to use them.

Riveted Steel Pipe
Well Casing
Concrete Forms
Stacks

Welded Steel Pipe
Oil & Water Tanks
Siphons
Flumes

MONTAGUE PIPE & STEEL CO
San Francisco California

Smith-Emery Co.

Chemists—Engineers

Established 1910

Analyses and tests.
Represent Pittsburgh Testing Laboratory
for inspection at Eastern foundries, mills and shops

Offices & Laboratories

245 So. Los Angeles St.
Los Angeles

651 Howard St.
San Francisco

Transcript *of* February P.C.G.A. Sessions

(Continued from Page 27)

nickel, chromium, copper and considerable alkalis and sulphates. The sulphates and alkalis injured the brick, reducing their melting point to about 1400 degrees. In the San Rafael plant where formerly checker brick lasted two years, they have failed within six months on two occasions.

K. N. CUNDALL (*San Francisco*). Analysis shows the oil to run .17 per cent ash which means a ton and a half of uncombustibles go into the San Francisco generators a day. The ash analyzed 70 per cent sodium sulphate, 10 per cent iron, 6 per cent silicates, and a varying amount of metallic substances. It is believed that the sodium sulphate fluxes and melts the brick and this action is speeded up by the presence of nickel, chromium and iron. The sulphates originate in the refining and treating process and the oil companies have offered no remedy.

J. A. HARRITT (*San Diego*) reported similar trouble.

Liquid Purification—K. N. Cundall (*San Francisco*) Chairman.

Mr. Cundall reported the successful operation of liquid purification installations, and a complete progress report including comparative costs will be made to the Convention. In San Francisco, from 95 to 100 per cent of hydrogen sulphide is being removed and converted into free sulphur. Recent refinements include the removal of cyanide by more efficient secondary scrubbing, the use of crude soda ash in place of the refined at a 27 per cent reduction in cost, and the removal of sulphur cake from the filter by compressed air. A ready market has been found for the highly toxic hydrocarbon sulphur produced. Two grades are turned out, one containing less than 30 per cent water and the other less than 5 per cent. The process now involves no difficulty from odors.

Condensing and Scrubbing—S. C. Schwarz (*Portland*) Chairman.

In the absence of Mr. Schwarz the following discussion took place.

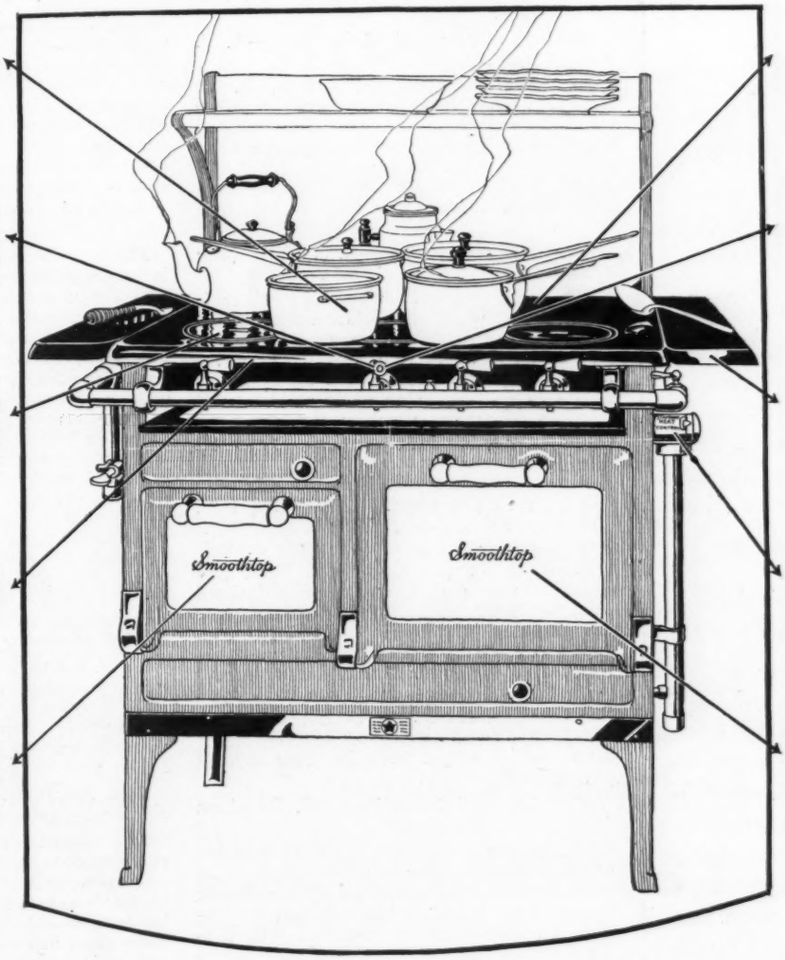
W. M. HENDERSON (*Los Angeles*) stated that in 1925, 500,000 gallons of liquid was pumped from drips (Los Angeles Gas & Electric Corporation) This was reduced to 240,000 gallons in 1926 due in some measure to the installation of a waterless gas holder.

T. N. KELLETT (*Los Angeles*) said that the L. A. G. & E. used about 50 gallons of water per thousand in wash boxes and 100 gallons in water scrubbers. Temperature of water about 80 degrees. This temperature has recently been educed in cooling towers and it is expected that less water will be used. An improved water spray is being developed. It is false economy to save power by cutting down on water and risk dirty gas.

J. A. HARRITT (*San Diego*) reported using 20 gallons per thousand of sea water in wash boxes and 60 gallons on scrubbers. The gas temperature is reduced to 175 degrees in the washbox.

W. S. YARD (*San Francisco*) said that San Francisco is putting in a recirculating system to permit the increase in scrubber water. This is desirable to effect cyanide removal. Cyanide contributes materially to internal corrosion of pipe. By increasing scrubber flow from 12 gallons per square foot per minute to 2.4 gallons, cyanides will be completely removed. At San Jose all water is now recirculated and there is a strong odor of ammonia around the cooling towers. This may become objectionable.

In San Francisco all high pressure gas is cooled in Braun type aftercoolers and mois-



Top capacity is 50% more than the ordinary range. Yet it occupies small kitchen space.

You can cook 4 vessels over one burner, or keep the whole dinner hot. The heat from one burner makes four cooking zones.

The top is enclosed. It is easy to keep clean. Lids can be removed for quick boiling.

Note the convenient table-height. No bending or stooping. Adds to kitchen's attractiveness.

A quick and efficient broiler sufficiently large to take care of your needs.

Holds 6 or 7 vessels at one time. A place to push them back and keep them hot.

You can do quick boiling, gentle boiling, simmering and warming all over one burner.

A permanent cooking-chart slides in the end-shelf and is always at your finger tips.

Added to Smoothtop's other conveniences is an Oven Heat Regulator. Keeps the oven temperature just where you want it.

A wonderful, large oven, that bakes evenly top and bottom. You will be delighted with the baking it does.

Smoothtop as a Sales Builder

Here are some of SMOOTHTOP'S possibilities as a Sales Builder:

1. Its new features give you a real reason for replacing old style ranges.
2. It enables you to increase your dollars and cents volume because its features are so appealing to women that you can sell it in preference to a cheaper range.
3. Its compactness gives it a field all its own. Kitchens today are so small that there is no room for a large range. SMOOTHTOP has the cooking capacity of a large range but takes only half the space.
4. Its new, smart appearance makes a particular appeal to architects, who are specifying it more and more.
5. Apartment and real estate developers are installing SMOOTHTOP because of its compactness, and also use it as talking point.

Let us show you how SMOOTHTOP is building sales for others and how it and our individualized sales and advertising service will build sales for you.

Northwest Gas & Electric Equipment Co.

Pacific Coast Distributors, Standard Gas Equipment Corp.

372 Pittock Block,
Portland, Oregon.

180 New Montgomery St.,
San Francisco, Calif.

164 So. Central Ave.
Los Angeles, Calif.

You Can Bury Your Pipe and Forget Re-Conditioning for Years, When Protected With—

ECLIPSE
SAVE-A-LINE

You can save thousands and thousands of dollars in repairs and replacements by protecting your pipe lines with this tough, elastic, non-cracking, non-peeling, heavy filmed coating.

ECLIPSE "Save-A-Line" has for years stood the only test that tells a true story—actual use in the fields. We can cite you instances where "Save-A-Line" has been used on pipe **laid in swamps** and on being examined years later was found to be **untouched with corrosion!**

The following well known companies subject all pipe line coatings under consideration, to a severe, but fair test. As a result they selected ECLIPSE "Save-A-Line" and are now using it regularly. The total of their orders last year ran into hundreds of caraloads.

ECLIPSE "Save-a-Line" is applied direct from package—no heating, sizing, wrapping of paper or burlap required.

Gulf Pipe Line Co.
Lone Star Gas Co.
Humble Pipe Line Co.
California Petroleum Co.
The Shell Co. of California.
Wilmington Gas Co.
Coast Counties Gas & Elec. Co.
Public Service Gas & Elec. Co.
New York State Gas & Elec. Co.

The Eclipse Paint & Mfg. Co.
Cleveland, Ohio, U.S.A.

Dallas Denver Newark
Philadelphia Charlotte, N. C.
San Francisco

ture trouble has been eliminated. There were 60,000 gallons of benzol sold in 1926. A cooling system will be installed for low pressure gas.

Holder Location and Maintenance—A. F. Bridge (*Los Angeles*) Chairman.

In the absence of Mr. Bridge, R. C. Boughton (*Los Angeles*) reported that the committee's report would go into the relative utility of high and low pressure holders including the wet and dry types. He introduced J. H. Kennedy (*Los Angeles*) who gave an illustrated talk on the waterless type holder.

Gas Main Construction—R. S. Fuller (*San Francisco*) Chairman.

Mr. Fuller reported that the committee is attempting to work out a solution to the problem of laying mains and services in such a manner as to avoid future cutting of pavement. While there have been thousands of stub services laid in an effort to solve this problem, information before the committee shows that a great percentage of them remain idle.

B. G. Williams (*Los Angeles*) said that less than 30 per cent of the stub services laid by the Southern California Gas Company in the last ten years have been used.

F. J. Shafer (*Los Angeles*): In a few instances where stub services are insisted upon, the Southern California Gas Company has put in one stub service for two lots with two stop cocks at right angles in the parkway thus reducing the investment one-half.

W. M. Henderson (*Los Angeles*): The Los Angeles Gas and Electric Corporation in 1926 had 880 odd thousand square feet of ditch opening, only 5 per cent being in hard paving.

Materials and Methods—R. C. Boughton (*Los Angeles*) Chairman.

Mr. Boughton said that the final objective of the committee was to prepare a code of methods and materials used in the Pacific Coast. This is such a big task that its preparation should not be confined entirely to the committee but every technical man should help. His idea is to write up methods and specifications for materials that have been proven by usage, thus providing a reference work of great value.

The following subjects are in course of preparation: Gasket materials, Westinghouse meters, Gantts charts, corrosion resistant pipe, boilers, welding rods, holder paints, cast iron main brazing, inspection methods on natural gas transmission main construction, pipe coating materials, governor pit ventilator fans, governor pit water-proofing and drippage measurement. He then asked for volunteers on the following subjects: Valves and cocks, water absorption from holders, perpetual inventory methods, valve packing for gas valves, sand blast equipment, methods for cleaning choked services, shovels, Robinson orifice meter fitting, asphalt heating kettles, regulator capacity tables, governor pit location, cast steel manhole covers. Anyone having valuable information on these subjects or any other, is requested to write it up and send it to the committee. A. R. Bailey then volunteered to write up "meter washers"; B. A. Williamson, "electrolysis"; W. M. Henderson, "sectionalizing a distribution system"; M. J. Cereghino, "orifice meters"; C. W. Beck, "straight shot generators"; H. S. Christopher, "field wrapping of pipe"; B. G. Williams and D. H. Perkins, "dust control"; E. Henderson, "compressor rod packing; C. D. Bell, "trenching machines"; C. H. Wilcox, "steam flow meters"; and F. H. Coble, "meter box doors."

Compressor Plants—A. B. Newby (*Taft*) Chairman.

Mr. Newby reported that the committee hoped to bring in a recommendation for a uniform color scheme for identifying plant pipe lines. It will also produce something on a method for keeping engine records, fire drills and periodic valve inspection T. C. Wallace will write a paper on a automatic emergency shut-off controls, and J. E. Wallace one on figuring horse power and efficiency.

Dust and Moisture Control—K. C. Tomlinson (*San Francisco*) Chairman.

Mr. Tomlinson reported that the committee is representative of both coal and oil gas, and has undertaken to study the causes of internal corrosion of gas mains. The study will involve the examination of pipe samples, subjecting steel wire to the action of corrosive constituents in gas such as moisture, oxygen, carbon dioxide and hydrocyanic acid; investigation of protective measures; examination of holder rivets and analysis of holder water; determination of acidity of drip water; investigation of means of removing dust; comparison of the corrosive action of dehydrated gas and gas from which acidic constituents have been removed, and determination of the relative EMF developed when iron is corroded by various means. The moisture problem is getting more and more serious as the plant men use more intensive scrubbing methods.

T. N. Kellett (*Los Angeles*) cited an instance tending to show that dust troubles were increased by the high velocities carried during peak hours. A large amount of iron rust accumulated in a holder drip when the holder was being filled at a rapid rate.

Gas Measurements—F. A. Hough (*Los Angeles*) Chairman.

Mr. Hough stated that the committee is studying the effect of pulsating flow upon the measurement of gas by orifice meters. Search of the literature has yielded very little definite information but has suggested valuable methods of attacking the problem. An experimental meter station is planned where pulsating flow can be produced over a range of rates, pressures and frequencies, and where there will be a positive means of checking the accuracy of the orifice meter measurements. A photo pulsometer adapted to high pressure work will be used to determine the character of the wave motions set up by the compressors. It is hoped to learn enough about the problem so that the committee can proceed in a systematic manner to solve the measurement problem. This work cannot be completed this year. The committee will be able to report on an instrument developed to record the moisture content of gas passing through orifice meters so that a proper correction can be applied and will also report on the work of the Measurement Committee of the Natural Gas Association.

There is also need for a standard pressure base for all orifice meter measurements. Three pressure bases used in Southern California are 14.4 plus 4 ounces, 14.6 plus 4 ounces, and 14.65 plus 4 ounces. The extreme difference in gas volume is nearly 2 per cent. The committee favors the universal base of 30 inches of mercury, and is corresponding with the Bureau of Mines and the Natural Gas Association regarding it.

B. G. Williams (*Los Angeles*): The Southern California Gas Company uses 14.65 plus 4 ounces. It was taken as an average over 10 years as supplied by the Weather Bureau.

C. D. Bell (*Los Angeles*): The Natural Gas Association adopted 14.4 as a standard a number of years ago and this is now

being used by a number of meter manufacturers.

In answer to a question Mr. Hough said that 16 diameters from an orifice meter is the minimum distance within which there can be any change of direction or a fitting or governor placed and this may be too close. W. M. Henderson suggested that governors be placed downstream.

Consumers Meters—D. E. Farmer (*Portland*) Chairman.

In the absence of Mr. Farmer, Mr. Cole (*Los Angeles*) reported that the committee is directing its principal effort to a study of the practical and economic factors involved in the use of rigid meter connections. This will cover customers' leak complaints, installation cost, cost of maintenance, and leakage. The committee will continue with its record of comparative meter performance statistics.

W. M. Henderson (*Los Angeles*) said that the advantage of using rigid connections with iron meters lies in the ease of making meter connections. This is usually done by one man and he often has difficulty in drawing the pipes together.

W. D. Dickey (*San Francisco*): Leakage at meter connections often is not through the washer but above or below it, caused because the meter is suspended and has a tendency to pull away. This is a big argument for the rigid connection for both tin and iron meters.

Load Factors—W. M. Henderson (*Los Angeles*) Chairman.

Mr. Henderson reported that the committee is continuing the work started last year, paying particular attention to individual, domestic and apartment house loads. The survey is divided into 13 divisions by appliances in use. A knowledge of load conditions, diversity factor and coincident demand is important in the design of distribution systems. It is common practice to install 100 per cent meter and service capacity, and the work of the committee shows that this is a waste of capital. Copies of proposed definitions were distributed with a request that members submit written comment on them. (These definitions also appeared in the November number of *Western Gas.*)

Unaccounted for Gas—B. G. Williams (*Los Angeles*) Chairman.

Mr. Williams reported that an effort was being made to determine the effect on "unaccounted for gas" of temperature and pressure at customers' meters, and to continue the compilation of statistics on contributing causes of actual leakage. The greatest argument in favor of the work is the saving in dollars and cents it effects.

H. C. Abbott (*Redondo Beach*) expressed the opinion that poor joints and improperly designed fittings seem to be the largest contributing factor to leakage. He mentioned street tees, bushings and threads inside and out, and lead and composition gaskets. A one hour test of new services would prevent much loss.

R. C. Boughton (*Los Angeles*) exhibited some temperature curves to show the variation in temperature between a point 3 feet 6 inches below ground and that at the meter. This is perhaps the greatest contributing cause to total "unaccounted for" and cannot be overcome. He suggested that partial compensation could be made by proving meters at the service pressure, and recommended this thought to the committee.

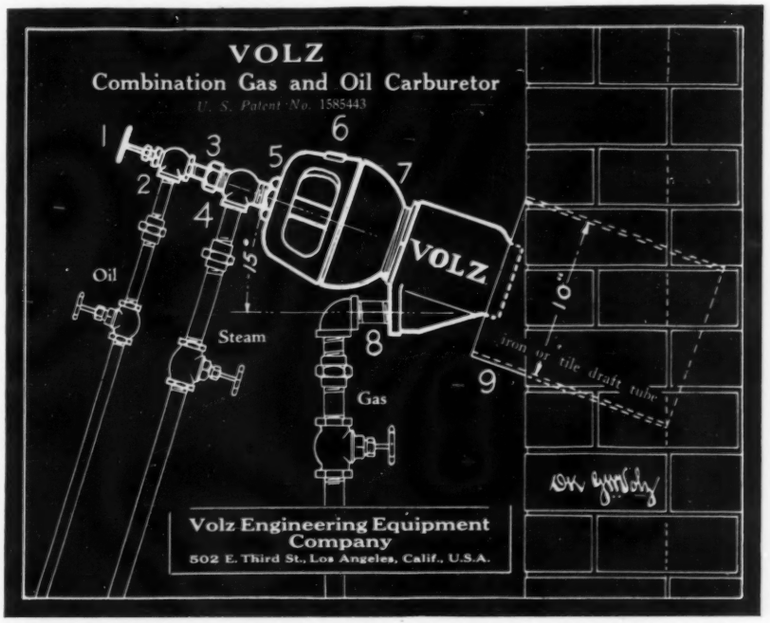
F. H. Coble (*Los Angeles*) disagreed with Mr. Boughton saying that the meter proof does not vary with the proving pressure.

Customers' Service—C. R. Miller (*Portland*) Chairman.

In the absence of Mr. Miller the report was made by C. D. Bell (*Los Angeles*) who said that the committee was making a thor-

VOLZ

No. 34 Combination Gas and Oil Carburetor



Low Pressure U. S. PATENT NO. 1585443 MAY 18, 1926 **Welding Heat**

Gives intense heat. Melts a heavy duty three inch iron tee in eleven minutes. Guaranteed to maintain steam pressure under heaviest loads.

Burns gas, or oil, or gas and oil together. Can be switched from gas to oil or vice versa, without slightest fluctuation in steam pressure.

Not in any sense an ordinary burner, but a ***carburetor*** in which wet gas, dry gas or oil is broken up or atomized and so thoroughly mixed with air and steam that the combustible area of the fuel is multiplied and heat units increased, giving an intensely hot fire because of practically complete combustion.

Gases show high carbon dioxid content, proving combustion thorough with little if any unburned fuel wasting away through stack.

Efficient on low draft or in conjunction with steam or compressed air, with gas at 4 ounces pressure upward or with lowest grade fuel oil. Suitable for any type boiler, furnace, still or oven.

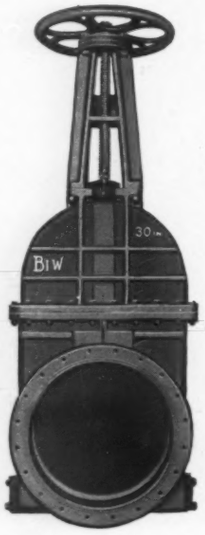
No. 34 Combination Gas and Oil Carburetor $45.00
No. 31 Low Pressure Gas Burner, for 4 oz. up 22.50
No. 3 High Pressure Gas Burner, for 4 lbs. up 14.75

VOLZ
ENGINEERING EQUIPMENT CO.

502 East Third Street
LOS ANGELES, CALIFORNIA, U. S. A.

BAKER IRON WORKS

Los Angeles, California



Manufacturers of

Gas Generating Equipment

Boilers—Tanks—Riveted Pipe

Structural Steel

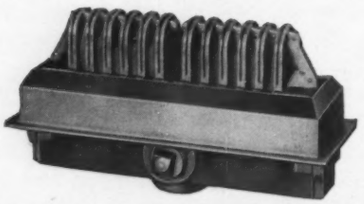
Elevators—Cranes—Hoists

Gray Iron Castings

Low Pressure Valves

R. M. C. Gas Burner

Is Efficient



Is Different

ROTARY MANUFACTURING CO.

5720 LONG BEACH AVENUE LOS ANGELES, CALIFORNIA

The Beacon Automatic Storage Water Heater

TEN SIZES FROM 12 GALS. TO 120 GALS.
FOUR MODELS FROM $57.50 UP

The Beacon is staunchly constructed and heavily insulated.. Seams are both riveted and welded.
Brass pipe is used in delivering hot water from the heating element (which is also brass) to the boiler. Brass keeps water clean.
Let us send you full particulars.

Beacon Water Heater Co.

Geo. F. Pearse

776 So. San Pedro St. Los Angeles, California

ough study of the organization of the service department and the work it is or should be responsible for.

Safety—R. R. Blackburn, (*Los Angeles*) Chairman.

The committee report consisted of an actual demonstration of first aid by three teams, one each from the Los Angeles Gas & Electric Corporation, Southern California Gas Company, and Midway Gas Company.

L. A. G. & E. INDUSTRIAL ASSISTANT IS APPOINTED

C. B. Barbour has recently been employed by the Los Angeles Gas and Electric Corp. as assistant to H. L. Masser, gas engineer for the corporation. Mr. Barbour was previously engaged in industrial gas work with the Southern California Gas Co.,, and before that, was with the Standard Oil Company.

A. G. A. DISTRIBUTION MEETING

The fourth American Gas Association Distribution Conference is to be held April 4 and 5 at the Belvedere Hotel, Baltimore, Md. By special arrangement, the Bureau of Standards will have on exhibition at Washington, April 6, specimens of pipe as taken out of various soils in the Bureau's soil corrosion investigation.

BUILDING CONTRACTS GAIN IN CENTRAL WEST REGION

February, 1927 was a good month in the Central West. New construction contracts increased 30 per cent over January, and 29 per cent over February of last year. Seventeen per cent of the contracts were for public works and utilities' projects.

UNANIMOUS VOTE GIVES GAS FRANCHISE IN BLAIR

Southwestern Light & Power Co. has been granted a gas franchise in Blair, Okla., by unanimous vote of those ballotting on the issue in a recent municipal election.

MAY SERVE MULDROW, OKLA.

The Citizens Gas Company of Fort Smith is understood to be seeking a franchise to serve Muldrow, Okla., with natural gas from the Muldrow-Roland field.

New Billing Method Brings Many Economies

(Continued from Page 22)

ibility and adaptability. All of the others seemed to require more adaptation of the system to the machine. Each was the best for what it wanted, but the Remington was the best for what we wanted. We were greatly helped in all our installations by C. G. Dominy, sales representative, and Eleanor Caldwell, demonstrator, who took just as much interest in our problems after the machine was decided upon, as before.

It is not to be understood that the system was born full grown, nor that we have not improved it with each installation as we made them successively in each of our eight districts during the past two years. But each improvement was readily incorporated in the previous installations, with no change of equipment and little change in forms used, from the first one made at Santa Monica. And we still expect to improve.

CUTTING LOOSE FROM PRECEDENT

When we decided to cut loose from the ledger idea entirely and evolved the straight Register sheet, recording the bills from the regular readings of each month separate to itself, as shown by the accompanying illus-

tration—bringing forward delinquencies—we found the solution to the main problem, i.e., providing a postcard bill and stub, with duplicate Register sheets at one operation. From the start we have also provided a distribution strip, running in the machine at the right of the Register sheet, in which the cubic foot consumption is segregated according to the blocks in our sliding scales. These segregated totals cannot be cleared from the machine unless they aggregate to the grand total of cubic feet accumulated from the bills themselves. This grand total is proven by an independent run from the meter book direct. The machine itself automatically locks against errors of subtraction, and against failure to repeat on the stub the same charge shown on body of bill. Accuracy of extension being proven by the segregated totals after elimination of any of these other errors, we have every assurance that both the consumer's statements and our own statistical and sales totals are correct, meter book by meter book, as the billing is finished. Delinquencies are always balanced, as brought forward, by meter book units.

The duplicate Register is posted by rubber dating stamp as collections are made in the subsidiary offices, after which stubs, with adding machine listing thereof (by meter books) and recapitulation of Cash Balance, are forwarded to the central office of the district, and posted by machine on the original Register. The daily totals and cumulative totals for the month posted to each book must balance the stub listing, and the daily and cumulative totals for the District (shown automatically in the posting machine) must balance the Cash Report made by District Office to General Office in Los Angeles. Checking for errors in posting is now a *rara avis* with us, and there is absolutely no rush work at the end of the month so far as monthly summaries of gas sales and collections are concerned. Notwithstanding the duplicate work involved, and in the face of constantly expanding business, we accomplish this with fewer operatives than with the pen ledgers.

HANDLING CLOSING BILLS

The solution as to regular headings still left us with the Closing Bill problem—and anyone who knows Southern California can realize that it was some problem. We have never attempted making these bills themselves on machines. We devised a triplicate form by which Reader's Order, Consumer's Bill, and Stub, could all be made at one writing (pencil). At first we tried registering these on the machine in the space left blank at the bottom of the regular Register sheets on which the regular readings of same meters appeared; but finally decided to cut away Closing Bills absolutely from location, except as to office—that is, all Closing Bills, for each office, are registered separate to themselves, showing daily a cumulative total, for the month to date, of both their new charges and their previous unpaid items. A very simple system of Transfer Credits was devised by which previous unpaid items were credited off of Regular Register as charged on Closing Bill Register, and a daily balance automatically maintained between these debits and credits. Each bill is given a serial number when prepared for registration and this number is posted opposite name of retiring consumer on the service record card for the proper address so that each is readily located for future reference.

A method, not so simple, but still workable, was also devised, by means of which an unpaid closing bill, left anywhere in our system, may be transferred to the first bill rendered to same consumer at new location

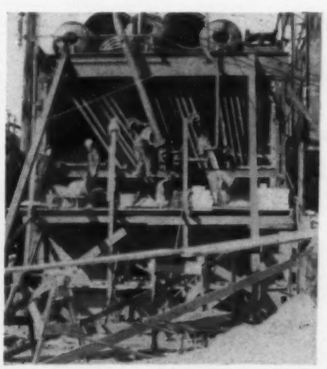
Stockton
Fire Brick Company

FIRE BRICK, INSULATING BRICK
HIGH TEMPERATURE CEMENT

High Grade Refractories
for
GENERATOR LININGS
CHECKERS
BOILER SETTINGS

OFFICE:
Rialto Building
San Francisco

WORKS:
Stockton
California



Brick work in progress—boiler installation L. A. Gas and Electric Co.

Any Place In The West
Established 1906
J. T. Thorpe & Son
Inc.
Fire Brick Contractors
Specializing in
Gas generator, boiler, still and furnace brick, industrial furnaces, retorts, kilns, brick smokestacks.

Portland
632 Ry. Exch. Bldg.
Los Angeles
321 W. 3d St.
San Francisco
417 Market St.
Seattle
939 Stewart Bldg.

REYNOLDS

Gas Regulator Company

Manufacturers
of

Gas Regulators and Governors

Holder Governors
Single District Station Regulators
Double District Station Regulators
High Pressure Service Regulators
Low Pressure Service Regulators
High Pressure Line Regulators
Intermediate Pressure Governors
Relief & Back Pressure Valves
Anti-Vacuum Quick Closing Valves
Separate Mercury Seals

Main Office and Factory *Anderson, Indiana*

Established 1892

Chas. C. Moore & Co. Engineers, Inc.

CONTRACTORS FOR COMPLETE PLANTS

High Grade Machinery

The Babcock & Wilcox water tube boilers
Corliss high speed and poppet valve engines
Babcock & Wilcox superheaters
Hamilton compressors
Green fuel economizers
Wheeler Condenser & Engineering Co. condensing machinery
Cochrane feed water heaters (open and closed)
Cochrane feed water metering heaters
Cochrane feed water softeners (hot and cold processes)
Cochrane steam and oil separators
Cochrane flow meters
Moore automatic fuel oil regulators
Diamond soot blowers
Lagonda tube cleaners
Copes feed water regulators
Lagonda automatic boiler stop valves
Leslie reducing valves

And All Power Plant Auxiliaries

Address our nearest office for catalogs and complete information

Home Office: San FRANCISCO, Sheldon Bldg.

New York City, Hudson Terminal Bldg.
Los Angeles, Central Bldg. Portland, Gasco Bldg. Seattle, L. C. Smith Bldg.
Salt Lake City, Kearns Bldg. Honolulu, T. H. Phoenix, Heard Bldg.
Vancouver, B. C., Standard Bank Bldg.

THERE IS A
PABCO PRODUCT
TO PROTECT
EVERY SURFACE

The Paraffine Companies, Inc.

San Francisco Oakland Los Angeles Seattle Portland

--if we can locate him, and we have a pretty good follow-up system.

One of the accompanying illustrations depicts the difference in bulk, under old and new systems, of the current records of the Santa Monica (city) office. The ledgers, at left, are just as we discarded them two years ago. The single Register, at the right, contains all the month's current business and all the unpaid active delinquent items of the same accounts which were carried in the ledgers, plus an increase, in number, of 26 per cent in the two years. It should be explained that each District Office, as well as its outlying subsidiaries, is provided with a duplicate register for its own counter use. In addition to the greater ease of reference to the accounts by their numbers, the confusion arising from the presence of closing bills and dead names, in the ledgers, is entirely eliminated by the Register.

SAVINGS OF NEW SYSTEM

The following advantages and savings from the operation of the system in the Santa Monica Bay District are obtained from a report made to the Secretary by the District Manager of that District:

Increase in Meters Connected, 1925 to 1927, 26 per cent.

Decrease in Employees engaged in Accounting work, 12½ per cent.

Postcard bills are neater and absolutely correct.

They are delivered more promptly, meter book being read one day and the bills being in the mail the succeeding evening.

Detail work that it was necessary for the traveling auditors to prove is vastly reduced.

Names and addresses are corrected to within 24 hours of mailing, which was impossible with ledgers and decentralized billing.

Ability now exists to handle great increase in number of consumers without increase in operating force.

Weekly trial balances have been eliminated, due to automatic daily balances furnished by posting machine.

All monthly report work has been taken out of sub-offices and the average time required in the District office has been reduced from two and one-half days to six hours. No more clerks are required for the computation for this entire district than previously for the Santa Monica City office alone.

A fair general average of the number of items handled by each operator in this district, per hour of actual operation, is: billing 135, posting 190. We have individual operators, both in this and in other districts, who have done better over given days, and even months; the above is computed for all the operators engaged in the Santa Monica district for the past year.

Campaign Sales Put Ranges *on* Kansas City Lines

(Continud from Page 23)

increases of about 3800 domestic customers annually were experiencing decreases in total gas sales of about 65,000,000 cubic feet annually. During these years the sale of about 3900 ranges, 2700 room heaters, 500 tank heaters annually at a merchandising profit was not stopping the decrease. As a whole it was a situation which could become very serious unless corrected.

Our analysis of this situation brought us to a further and more complete realization that, even without unusual electric cooking competition, these companies were undoubtedly gradually and permanently losing a portion of their domestic cooking load, due

to changes in customs and habits of people, particularly in large cities. We believe a few of the more important factors causing these decreases were: The very rapid growth of the restaurant business, the prepared foods on the market, the increased use of automobiles, the increased outside activities which forced the housewife to cut down the time spent in the kitchen, and of course the replacing of obsolete and inefficient gas stoves with modern and efficient stoves.

During 1925 a Doherty New Business Department was organized, trained, and made ready for the important work of 1926 and succeeding years. A thorough survey of ultimate and reasonable possibilities for all classes of gas sales was made, which included a 10-year budget and the establishing of satisfactory industrial and house heating rates. Briefly, our 1926 budget was arranged as follows:

ONE YEAR'S PROGRAM

In our domestic operations we felt that by heavily increasing our sales of full sized, semi and full-enameled oven heat regulated gas ranges, we could replace many unsightly, small and little used stoves, in this manner encourage more pride in the kitchen equipment and more convenient home cooking, hoping this would check a portion of the annual decrease and at least create a greater customer investment in gas cooking equipment, which is especially desirable if electric cooking is available. In addition, a limited amount of home service work was planned.

Room heater sales were heavily increased. Special campaigns on automatic storage system gas water heaters replacing tank heaters and furnace coils were planned. Incinerators, gas heated home laundry equipment and other miscellaneous appliances were given minor attention. A very intensive industrial gas sales program was definitely established; a very intensive six months house heating activity decided upon.

The consolidated sales operation was set up in the form of a monthly as well as an annual operation with a definite monthly objective on each class of sale.

For the year 1926 the following appliances and equipment were sold:

SALES

Quantity	*Item*
6,466	Gas Ranges.
3,118	Room Heaters.
139	Tank Heaters.
745	Storage Systems.
2,130	Gas designed furnaces and conversions.
164	Hotel and Restaurant Ranges.
82	Miscellaneous pieces restaurant equipment.
25	Bake Ovens.
36	Steam and Hot water Boilers.
425	Industrial Burners.
Grand Total 13,330	

We estimate that one full year's use of the appliances and equipment sold will give us about 719,700,000 cubic feet new added annual consumption, divided as follows: Water heating 14,900,000, house heating 319,500,000. Industrial, all classes, 385,300,000.

Our rates as applied to these loads are yielding an average price per thousand of: Domestic 90 cents, house heating 75 cents, industrial 60 cents. Under these rates we estimate that one full year's use of the load connected in 1926 will give us about $495,000 new added annual gas revenue.

I will explain how closely these estimated new added annual consumptions check with

Save pipe line dollars!

PIONEER RUBBERTEX applied to your exposed or buried pipe lines:

—resists electrolysis
—eliminates alkaline erosion
—resists acid erosion
—successfully combats crystallization
—will not chip or scale even when frozen
—adds years of service

...all of these protective features are reflected in terms of increased profit to you!

TRY THIS TEST!

Heat some Pioneer Rubbertex to a liquid consistency and flow it onto a piece of sheet metal or pipe. Place the piece of metal on ice and freeze as long as you wish. While both metal and Rubbertex are at this extremely low temperature you can bend the metal or twist it. The Rubbertex will not crack or chip off.

Established 1888

Los Angeles Portland
San Francisco Seattle
Denver Spokane

Pioneer RUBBERTEX

Pioneer Manufactures a complete line of Roofing and Building Papers on Sale at Lumber, Building Material and Hardware Dealers

FORGED STEEL PIPE FLANGES

SHIPMENTS FROM LOS ANGELES STOCK

HOFFMAN SUPPLY COMPANY, Sales Agts.,
324 NO SAN PEDRO STREET
LOS ANGELES, CALIF.
Telephone MEtro. 2123

VAN STONE NIPPLES
HIGH HUB · LOW HUB · REDUCING · WELDING · BLIND

Manufactured by
PHILADELPHIA STEEL & IRON COMPANY,
PHILADELPHIA, PENNSYLVANIA

FLANGES MFG'D TO SPECIFICATIONS

Radiants!

—now made in the West

NO longer is it necessary to look to the East for radiants, as we are equipped to furnish Western manufacturers of gas heaters with *every* type. ¶ Prompt delivery is assured; the direct cooperation of our engineers is available, and as for quality, AMERICAN RADIANTS are unsurpassed. ¶ We strongly recommend your investigation, as there are obviously many advantages in using this Pacific Coast product.

Complete information and prices on request

AMERICAN REFRACTORIES CO.

3132 ALOSTA STREET
LOS ANGELES, CALIFORNIA
Telephone ANgelus 7350

The STRICKLER
Ratchet Pipe Cutter

The STRICKLER Ratchet Pipe Cutter automatically cuts cast iron, steel and wrought iron pipe (from 1½ to 30" in diameter) by hand (either in the trench or in the shop).

You can cut any pipe from any position easily. Simply pump the handle and the STRICKLER does the rest. Order your STRICKLER Now

W. W. STRICKLER & BROS.
1475 Oak Street Columbus, Ohio

what we are actually experiencing. The Kansas Cities Companies closed the year 1926 with a net increase in gas sales over 1925 of 446,571,000 cubic feet. Of course only about one-half of the year's use of the total load connected month by month in 1926 was reflected in the 1926 consumption. Our detailed analysis of the actual monthly consumption of the larger industrial loads and house heating installations proves to us conclusively that our actual consumptions on a full year's use of the equipment connected will be just about in line with our estimates.

Considering the January 1, 1926, existing investment in stocks and accounts receivable, only about one-half million dollars additional money was required in 1926 to finance the operation. Under our classification of accounts the entire expense of these operations was charged to the sales department, with the exception of interest on stocks and accounts receivable and a few minor accounting and general expenses. Under this classification the expense of doing the entire job was $136,000, which included the usual amount of good will and rate educational work with our customers. Putting it another way, 29-cent net sales department expense per dollar new added annual revenue connected.

The total sales value of the merchandise and equipment sold was $1,163,021, or about $11 per customer, divided as follows: Domestic $693,026, house heating $311,726, industrial $158,269.

In 1926 during two ten-day customer ownership campaigns on our securities the sales departments sold $350,000 market value securities.

As near as we were able to determine, our range sales activity did not have a great deal of effect on the decrease we were experiencing. Of course the 745 automatic storage system gas water heaters will give us about 14,900,000 cubic feet annually from our domestic customers, but this should not be confused with decreases in cooking load. However, about 20,000 net profit realized on our range sales and accruing to our consolidated operation reduced the expense of attaching major revenue producing equipment such as house heating and industrials.

HOLDING COOKING LOAD

To increase, develop, or even hold our own on our cooking load consumption it will no doubt be necessary for us:

To create the highest possible customer investment in attractive, easily operated gas ranges;

To furnish the customer with a gas fuel hot water service the same as his cold water service, his telephone service, electric light service 24 hours a day;

To furnish the customer with clean, convenient automatic gas fuel house heating;

To induce if possible, or follow up with furnishing the customer with gas refrigeration, home laundry equipment, incinerators, and as many miscellaneous gas using appliances as are practical and suited to his needs;

To always furnish instant and satisfactory service to all customers in the operation and maintenance of their gas equipment;

In other words to popularize the use of gas in the home. Our 1927 budget includes just about such promotion of our situation.

Without such promotion I imagine the decrease would go on indefinitely, considering that electric cooking is available. As a natural gas company under almost any circumstances we would never lose the domestic cooking load as completely as we have the gas light load, but there is a portion of it that we have lost definitely and permanently. Although we are watching closely

the consumption figures on our cooking load the decrease we are experiencing on just that load is in reality a minor consideration in its relation to the total new loads being connected.

In our case it is unfortunate that the gas using appliances which can be merchandised at a profit, such as ranges and room heaters, do not, as a rule, bring in any material amount of new gas revenue, largely due to replacements, but the sale of these appliances does tend to hold present revenue. For example, a customer owning a good gas range, when moving from one location to another is more apt to use such range rather than one requiring other than gas fuel.

In my opinion it is the appliances and equipment such as house heating, storage water heating and industrial, which will place on our lines the business from which will be derived the major part of our new and additional gas revenue. We can not merchandise these classes of appliances and equipment at a merchandising profit and we will always need large appropriations for the sales department in order to secure substantial increases in gas ravenue.

It is not difficult for a competent sales manager of a gas utility to operate his department at a merchandising profit, and I know of a number of such departments that are operated at a profit, but it would be difficult and no doubt impossible for such departments to definitely and positively trace important increases in gas consumption to their efforts.

On the other hand, I know of a number of gas companies that are spending from $20,000 to $200,000 annually in sales operations who can trace decided improvements in consumption, gross revenue and net earnings to their sales department activities, and who each year increase the sales department appropriation.

With cash available to finance operations, the important figure to us was not the profit or expense of the department or the dollars value equipment sold, but the relation of the sales department expense to new gas revenue actually connected through the activities of the department.

The last word in operating economy had been applied to our situation. An increase in rates would not have solved the problem. A thorough survey of the situation followed by the right combination of financing, rates and sales department activities was the answer.

50-YEAR FRANCHISE GIVEN FOR PAMPA, TEXAS

Dr. Fred Boze of Tulsa, Okla., has been awarded a 50-year franchise to supply Pampa, Texas, with gas, at 50 cents per thousand cubic feet. A ten per cent discount for cash is to be allowed, and the sliding scale to quantity users will drop as low as eight cents a thousand.

OKLAHOMA G. & E. EARNINGS

Net earnings of $1,109,794, as compared with $692,757 the year before, were shown in the Oklahoma Gas & Electric Company's annual report filed in March. Gross earnings increased about two million dollars over 1925.

WORLAND GIVES FRANCHISE

The town council of Worland has granted a franchise to the Wyoming Gas Company to furnish domestic and industrial gas. The line, which is now under way, is to be complete by August first.

SPRAGUE METERS

Represent Twenty-five Years of Progress

We are proud of our Service in the West

Sprague Meter Company

Los Angeles, California

San Francisco, California

WESTERN GAS
626 South Spring Street,
Los Angeles, California

Starting with the next monthly issue, you may send WESTERN GAS to the undersigned. Upon receipt of invoice, remittance will be sent to cover (1 year $2.00) or (3 years $5.00).

Name ..... *Title* .....

Company .....

Address .....

City and State .....

Please Check

[ ] GAS COMPANY [ ] GAS APPLIANCES
[ ] NATURAL GASOLINE CO. [ ] MISCELLANEOUS

Subscription: 1 Year, $2.00; 3 Years, $5.00, in Advance

A WESTERN GUIDE to INDUSTRIAL PURCHASING

Readers interested in any articles not listed in these pages are cordially invited to advise *Western Gas* of their wants and every effort will be made to furnish a list of the proper manufacturers. Addresses of companies listed on these pages may be found by consulting their advertisements in this issue.

Absorption and Compression Plant Equipment
Baker Iron Works.
C. F. Braun & Co.
Chaplin-Fulton Mfg. Co.
J. A. Campbell.
Jensen Instrument Co.
Southwestern Engineering Corp.
The E. A. Key Company
Western Pipe & Steel Co.

Absorption Towers
Baker Iron Works.
C. F. Braun & Co.
J. A. Campbell.
S. Herbert Lanyon
Southwestern Engineering Corp.
Semet-Solvay Engr. Corpn.
Western Pipe & Steel Co.

Abrasives
Abrasive Engineering Corp'n.

Acetylene, Dissolved
Commercial Acetylene Co.

Adjustable Plugs
Lattimer-Stevens Co.
Western Pipe & Steel Co.

Agitators
Baker Iron Works.
Western Pipe & Steel Co.

Aluminum Bronze Powder for Paint
Hill, Hubbell & Co.
The Paraffine Co.s, Inc.

Analyzers
C. F Braun & Co.
A. R. Maas, Laboratories.
Smith-Emery Co.

Annealers (Bar, Blank, Strip)
Pacific Meter Works.

Anti-Fluctuators
Pacific Meter Works.

Apparatus, Experimental Gas
The Alpha-Lux Co., Inc.
Pacific Meter Works.

Appraisals and Valuations
Smith-Emery Co.

Automobile Tires
Truck Tire Service Co.

Bags, Gas Main
C. B. Babcock Co.
Connelly Iron Sponge & Governor Co.
Mueller Co.
Safety Gas Main Stopper Co.
Semet-Solvey Engr. Corpn.

Barometers
Jensen Instrument Co.
Westcott & Greis, Inc.

Bench Iron Work
General Gas Light Co.

Blast Gates
Montague Pipe & Steel Co.
Semet-Solvay Engr. Corpn.

Blocks and Tiles, Fire Clay
The Alpha-Lux Co., Inc.
American Refractories Co.
Los Angeles Pressed Brick Co.
Semet-Solvay Engr. Corpn.
Stockton Fire Brick Co.
S. Herbert Lanyon.

Blowers and Boosters
Ingersoll-Rand Co.

Blowpipes
Montague Pipe & Steel Co.

Boiler—Brickwork
J. N. J. Firebrick Co.
J. T. Thorpe & Son, Inc.

Boiler Equipment
E. A. Key Co.

Boiler Maker's Tools
E. A. Key Co.

Boilers, Gas-Fired
C. B. Babcock Co.
Baker Iron Works.
Montague Pipe & Steel Co.

Boiler Settings, Pipe and Boiler Insulation
S. Herbert Lanyon.
Pioneer Paper Company.
J. T. Thorpe & Son, Inc.

Boilers, Waste Heat
Baker Iron Works.

Boilers, Water Tube
Baker Iron Works.
Montague Pipe & Steel Co.
Southwestern Engineering Corp.
Western Pipe & Steel Co.

Boxes
Baker Iron Works.
Semet-Solvay Engr. Corpn.

Brass (rods, sheets, tubes, wire)
Mueller Co.

Breakers
Ingersoll-Rand Co.

Breeching (Boiler and Stack)
Western Pipe & Steel Co.

Brick, Firebrick
Abrasive Engineering Corp'n.
The Alpha-Lux Co., Inc.
American Refractories Co.
Los Angeles Pressed Brick Co.
S. Herbert Lanyon.
Semet-Solvay Engr. Corpn.
Stockton Fire Brick Co.

Brick, Firebrick—Installation
J. N. J. Firebrick Co.
J. T. Thorpe & Son, Inc.

Brushes, Wire Pneumatic
Abrasive Engineering Corp'n.
Ingersoll-Rand Co.

Buildings, Steel
Baker Iron Works.
Western Pipe & Steel Co.

Bunkers, Steel and Concrete
Western Pipe & Steel Co.

Burners, High Pressure
S. Herbert Lanyon.
Lee B. Mettler.
Rotary Manufacturing Co.

Burners, Low Pressure
C. B. Babcock Co.
General Gas Light Co.
S. Herbert Lanyon.
Lee B. Mettler.
Payne Furnace & Supply Co.
Rotary Manufacturing Co.

Burners—Oil
Rotary Manufacturing Co.

By-product Recovery Apparatus
Oliver Continuous Filter Co.
Semet-Solvay Engr. Corpn.

Calorimeter Accessories
Pacific Meter Works.

Calorimeters
The Alpha-Lux Co., Inc.
Pacific Meter Works.

Cases, Meter
Pacific Meter Works.
Pittsburgh Meter Co.

Casinghead, Gas Meters
Jensen Instrument Co.
Pacific Meter Works.
Pittsburgh Meter Co.
The Foxboro Co., Inc.

Casing and Tubing (steel)
Montague Pipe & Steel Co.
Semet-Solvay Engr. Corpn.
South Chester Tube Co.

Casing—Iron
South Chester Tube Company

Cast Iron Pipe
Semet-Solvey Engr. Corpn.
United States Cast Iron Pipe and Foundry Co.

Castings
Philadelphia Steel & Iron Co.
Semet-Solvay Engr. Corpn.
United States Cast Iron Pipe and Foundry Co.

Cement
Abrasive Engineering Corp'n.
Stockton Fire Brick Co.

Cement, High Temperature
Stockton Fire Brick Co.

Cement—Plastic
Pioneer Paper Company.

Centrifugal Pipe
United States Cast Iron Pipe and Foundry Co.

Charging Machines (retort, etc.)
Semet-Solvay Engr. Corpn.

Checker Brick
Abrasive Engineering Corp'n.
American Refractories Co.
Los Angeles Pressed Brick Co.
Semet-Solvay Engr. Corpn.
Stockton Fire Brick Co.

Chemical and Gas Testing Apparatus
The Alpha-Lux Co., Inc.
Pacific Meter Works.
Westcott & Greis, Inc.

Chemists, Analytical
A. R. Maas, Laboratories.
Smith-Emery Co.

Chimneys, Radial Brick
American Refractories Co.
Los Angeles Pressed Brick Co.
Stockton Fire Brick Co.

Chimneys, Radial Brick Installation
J. N. J. Firebrick Co.
J. T. Thorpe & Son, Inc.

Chutes (coal, coke, ash)
Semet-Solvay Engr. Corpn.
United States Cast Iron Pipe and Foundry Co.

Clamps and Sleeves, Pipe
Mueller Co.

Clamps, Service
Mueller Co.

Cleaners, Service
C. B. Babcock Co.
Pacific Meter Works.

Coal Gas Plants
Semet-Solvay Engr. Corpn.

Coal Tar Products and Chemicals
A. R. Maas, Laboratories.
The Paraffine Co.s, Inc.

Cocks
C. B. Babcock Co.
Lattimer-Stevens Co.
Merco Nordstrom Valve Co.
Mueller Co.
Geo. D. Roper Corporation.

Coils and Bends
Philadelphia Steel & Iron Co.

Collectors, Dust
Western Pipe & Steel Co.
Semet-Solvay Engr. Corpn.

Compressors, Air
The C. & G. Cooper Co.
Ingersoll-Rand Co.
Oliver Continuous Filter Co.
Robertson & Company.

Compressors, Gas
The C. & G. Cooper Co.
Ingersoll-Rand Co.

Compressors, High Pressure
The C. & G. Cooper Co.
Ingersoll-Rand Co.

Compressors, Portable
Ingersoll-Rand Co.
Robertson & Company.

Condensers
Baker Iron Works.
C. F. Braun & Co.
Ingersoll-Rand Co.
S. Herbert Lanyon.
Southwestern Engineering Corp.
Semet-Solvay Engr. Corpn.

Condenser Boxes
Baker Iron Works.

Condenser Tubes
Semet-Solvay Engr. Corpn.

Controllers
Jensen Instrument Co.
The Foxboro Co., Inc.

Controlling Devices, Electric
L. R. Teeple Co.

Controls, Air and Steam
Jensen Instrument Co.
S. Herbert Lanyon.
C. F. Braun & Co.
The Foxboro Co., Inc.
S. Herbert Lanyon.
Steere Engineering Co.
L. R. Teeple Co.

Cooling Systems
S. Herbert Lanyon.
Semet-Solvay Engr. Corpn.

Cooling Towers
C. F. Braun & Co.
J. B. Gill Corporation.
Southwestern Engineering Corp.
Semet-Solvay Engr. Corpn.

Counters, Revolution
Jensen Instrument Co.

Couplings
Pittsburgh Meter Co.

Coverings (Tank, Boiler, Cold and Steam Pipe)
The Paraffine Co.s, Inc.
Pioneer Paper Company.

Cubic Foot Bottle
Pacific Meter Works.

Cutters, Pavement
Ingersoll-Rand Co.
Robertson & Company.

Cutters, Pavement
Ingersoll-Rand Co.

Cylinders, Compressor
The C. & G. Cooper Co.
Semet-Solvay Engr. Corpn.

Dephlegmaters
C. F. Braun & Co.
Southwestern Engineering Corp.
Semet-Solvey Engr. Corpn.
Western Pipe & Steel Co.

Diaphragms, Meter
Chaplin-Fulton Mfg. Co.
Pacific Meter Works.
Pittsburgh Meter Co.

Diggers, Clay
Ingersoll-Rand Co.
Robertson & Company.

Discharging Machines (retort, etc.)
Semet-Solvay Engr. Corpn.

Displacement System, Tar
Semet-Solvey Engr. Corpn.

Ditcher
Robertson & Company.

Door, Clean-out
Baker Iron Works.
Semet-Solvay Engr. Corpn.

Drills
Ingersoll-Rand Co.
Mueller Co.

Drill Pipe—Iron
South Chester Tube Company

Drill Pipe—Steel
South Chester Tube Company

Dryers
Payne Furnace & Supply Co.

Elevators
Baker Iron Works.

Engineers and Engineering Service
J. B. Gill Corporation.
A. R. Maas, Laboratories.
Smith-Emery Co.
Southwestern Engineering Corp.
Semet-Solvay Engr. Corpn.
Western Pipe & Steel Co.

Engines, Diesel
The C. & G. Cooper Co.

Engines, Gas
The C. & G. Cooper Co.
Ingersoll-Rand Co.

Engines, Oil
The C. & G. Cooper Co.
Ingersoll-Rand Co.

Engines, Steam
Ingersoll-Rand Co.

Evaporating Apparatus
C. F. Braun & Co.
United States Cast Iron Pipe and Foundry Co.
S. Herbert Lanyon.
Southwestern Engineering Corp.

Excavators, Ditch and Trench
Robertson & Company.

Exchangers, Heat
Baker Iron Works.
C. F. Braun & Co.
S. Herbert Lanyon.
Southwestern Engineering Corp.
Semet-Solvay Engr. Corpn.
Western Pipe & Steel Co.

Exhausters
Ingersoll-Rand Co.
S. Herbert Lanyon.
United States Cast Iron Pipe and Foundry Co.

Experimental Apparatus
S. Herbert Lanyon.
Pacific Meter Works.

Extractors
Semet-Solvay Engr. Corpn.

Extinguishers, Fire
American La France Fire Engine Co.

Faucets, Drain
Mueller Co.

Felt—Deadening
Pioneer Paper Company.

Filters
S. Herbert Lanyon.
Oliver Continuous Filter Co.
United States Cast Iron Pipe and Foundry Co.

Fire Clay and Products
The Alpha-Lux Co., Inc.
American Refractories Co.
S. Herbert Lanyon.
Los Angeles Pressed Brick Co.
Stockton Fire Brick Co.

Fire Brick Contractors
J. T. Thorpe & Son, Inc.
Stockton Fire Brick Co.

First Aid Equipment
American La France Fire Engine Co.

Fittings
Hoffman Supply Co.
Philadelphia Steel & Iron Co.
Semet-Solvay Engr. Corpn.
United States Cast Iron Pipe and Foundry Co.

Fixtures, Lighting (Domes, Portables, etc.)
C. B. Babcock Co.
Welsbach Company.

Flashlights and Batteries
The Paraffine Co.s, Inc.

Feed Water Heaters
C. F. Braun & Co.
S. Herbert Lanyon.
Southwestern Engineering Corp.

Fire Brick
Abrasive Engineering Corp'n.
The Alpha-Lux Co., Inc.
American Refractories Co.
S. Herbert Lanyon.
Los Angeles Pressed Brick Co.
Stockton Fire Brick Co.
Semet-Solvay Engr. Corpn.

Flanges
Hoffman Supply Co.
Montague Pipe & Steel Co.
Philadelphia Steel & Iron Co.
Pittsburgh Meter Co.
Semet-Solvay Engr. Corpn.
Westcott & Greis, Inc.
S. Herbert Lanyon.

Floodlights

Flooring—Industrial
Pioneer Paper Company.

Forged Steel Pipe Flanges
Philadelphia Steel & Iron Co.

Forgings
Baker Iron Works.
Philadelphia Steel & Iron Co.
S. Herbert Lanyon.
Payne Furnace & Supply Co.
Potter Radiator Corporation.
Pacific Gas Heating Co.
Geo. D. Roper Corporation.
J. T. Thorpe & Son, Inc.

Classified Advertising

Classified advertising five cents per word; minimum $2.00 per insertion. Situation Wanted advertisements up to 50 words will be published three consecutive issues without charge.

Situations Wanted

Note: Western Gas will publish free of charge, under this heading, advertisements of situations wanted. Maximum length, 50 words; additional space at classified rates five cents per word per insertion. Copy should be neatly typewritten on one side of paper only, and should be mailed to reach *Western Gas* not later than the 20th day of the month prior to publication date.

Natural Gas Man—Can install and operate gas plant, repair and test meters and gas wells. Has own bookkeeper; also assistant gas man who knows the business. Best of references. What have you to offer? Address Box A-6, care of *Western Gas*.

WADSWORTH LEAVES STATES FOR HAITI POSITION

G. W. Wadsworth, who has been with the Southern Counties Gas Co. for the past five years, the latter part of the period as secretary to F. S. Wade, vice-president and general manager of the utility, left the company on the twentieth of March for Port au Prince, Haiti, where he will be employed in the office of the financial advisor of Haiti.

REVOCABLE PERMIT LAW GETS SUPPORT IN OKLAHOMA

In a recent vote on a measure to repeal the revocable permit law in Oklahoma the revocable permit was sustained by a defeat of the repeal bill in both houses of the state legislature.

MIDWAY APPLIES FOR PERMIT TO SERVE TEHACHAPI

Midway Gas Company has applied to the California Railroad Commission for authority to exercise franchise rights granted by the town of Tehachapi for the distribution and sale of natural gas or a mixture of natural and manufactured gas in that community.

SO. CAL. GAS PILES UP BIG RECORD OF EARNINGS

A net income of $1,118,028.49 was shown in the Southern California Gas Company's financial report for the year ending December 31, 1926, which was issued in March. During the year 1926 the company gained 15,504 customers, making a present total of 183,576.

NEW ORLEANS OFFICE FOR MERCO-NORDSTROM

An additional district office has been opened by the Merco-Nordstrom Valve Company, at New Orleans. The location is at 1501 Masonic Temple. The Houston, Texas, office of the company has been recently removed to 1315 Petroleum Building.

FIRE BRICK

THROUGHOUT the West, the Gas Industries are depending on the Fire Brick service of this pioneer organization. Standard sizes for—

LININGS — CHECKERS
BOILER SETTINGS

are carried in stock for quick shipment. If special or hand-made shapes are required, our plant is especially well equipped to make them.

Fire Clay, Hollow Tile—all clay products used by the Gas Industry—are included in our service.

Write or phone us for complete information.

LOS ANGELES
PRESSED BRICK CO
GLADDING, McBEAN & CO
621 So Hope St Trinity 5761
LOS ANGELES

284

Photo Western Pipe & Steel Co.

*The new line of the Marin Municipal Water District is sometimes referred to as the "world's crookedest pipe line." It is largely due to developments in Acetylene welding practice that such a steel line is possible.

The Crookedest Pipe Line

made possible through Acetylene Welding was

Completed on Schedule

Commercial Acetylene Supply Service was back of the Gas delivery.

Commercial Acetylene Supply Co., Inc.

417 Market St., San Francisco 5600 Bickett St., Los Angeles
Warehouses in All Important Centers

Furnaces, Floor
Electrogas Furnace Co.
Payne Furnace & Supply Co.
Pacific Gas Heating Co.
Potter Radiator Corporation.

Furnaces, Lead Melting
C. B. Babcock Co.
Mueller Co.
Payne Furnace & Supply Co.
Potter Radiator Corporation.

Gas Analysis Apparatus
Jensen Instrument Co.
Pacific Meter Works.
The Foxboro Co., Inc.

Gas Meter Stop Cocks and Valves
Lattimer-Stevens Co.

Gas Main Tapping & Drilling Machines
Mueller Co.

Gaskets
Pittsburgh Meter Co.
Safety Gas Main Stopper Co.
Semet-Solvay Engr. Corpn.
The E. A. Key Company

Gasket Compound
E. A. Key Co.

Gasometer
Pacific Meter Works.
Semet-Solvay Engr. Corpn.

Gas Pipe Line Construction
Robertson & Company.
Semet-Solvay Engr. Corpn.
Western Pipe & Steel Co.

Gauges
The Alpha-Lux Co., Inc.
Jensen Instrument Co.
Pacific Meter Works.
Pittsburgh Meter Co.
The Foxboro Co., Inc.
Semet-Solvay Engr. Corpn.
Westcott & Greis, Inc.

Gauges, Steam
Jensen Instrument Co.
Semet-Solvay Engr. Corpn.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Gauges, U Type
C. B. Babcock Co.
Jensen Instrument Co.
Lee B. Mettler.
Pacific Meter Works.
Safety Gas Main Stopper Co.
Semet-Solvay Engr. Corpn.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Generators, Acetylene
Commercial Acetylene Co.

Generators, Water Gas
Baker Iron Works.
Semet-Solvay Engr. Corpn.

Glassware
Westcott & Gries, Inc.

Governors
C. B. Babcock Co.
Chaplin-Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Pacific Meter Works.
Reynolds Gas Regulator Co.
Sprague Meter Co.
Semet-Solvay Engr. Corpn.
Westcott & Greis, Inc.

Hammers
Ingersoll-Rand Co.

Hanger, Meter
Mueller Co.

Hangers, Iron and Steel
Baker Iron Works.
Philadelphia Steel & Iron Co.

Heaters
C. B. Babcock Co.
Baker Iron Works.
C. F. Braun & Co.
General Gas Light Co.
S. Herbert Lanyon.
Pacific Gas Heating Co.
Payne Furnace & Supply Co.
Potter Radiator Corporation.
Welsbach Company.
John Wood Mfg. Co.

Heaters, Floor
Electrogas Furnace Co.
General Gas Light Co.
Pacific Gas Heating Co.
Payne Furnace & Supply Co.
Potter Radiator Corporation.

Heaters, Wall
C. B. Babcock Co.
General Gas Light Co.
Pacific Gas Heating Co.
Payne Furnace & Supply Co.
Potter Radiator Corporation.

Heat Exchangers
Baker Iron Works.
C. F. Braun & Co.
S. Herbert Lanyon.
Southwestern Engineering Corp.
Semet-Solvey Engr. Corpn.
Western Pipe & Steel Co.

Heat Interchangers
C. F. Braun & Co.
S. Herbert Lanyon.
Southwestern Engineering Corp.
Semet-Solvay Engr. Corpn.
Western Pipe & Steel Co.

Hoists
Ingersoll-Rand Co.

Holders
Baker Iron Works.

Holders, High Pressure
Baker Iron Works.
Western Pipe & Steel Co.

Hoppers
Montague Pipe & Steel Co.

Hose, Air
Ingersoll-Rand Co.

Hot Plates
C. B. Babcock Co.
Geo. D. Roper Corporation.

Hygrometers
Jensen Instrument Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Incinerators
C. B. Babcock Co.
Baker Iron Works.
S. Herbert Lanyon.
J. T. Thorpe & Son, Inc.
Western Pipe & Steel Co.

Incinerator Brickwork
J. N. J. Firebrick Co.
J. T. Thorpe & Son, Inc.

Indicators
S. Herbert Lanyon.
Westcott & Greis, Inc.

Instruments (Measuring, Testing and Recording)
The Alpha-Lux Co., Inc.
Jensen Instrument Co.
National Meter Co.
Pacific Meter Works.
The Foxboro Co., Inc.
Semet-Solvay Engr. Corpn.
Westcott & Greis, Inc.

Insulating Materials
Beacon Water Heater Co.
The Paraffine Co.s, Inc.
Pioneer Paper Company.
Stockton Fire Brick Co.

Kilns
J. T. Thorpe & Son, Inc.
Western Pipe & Steel Co.

Kilns—Brickwork
J. N. J. Firebrick Co.

Laboratory Supplies
Mueller Co.
S. Herbert Lanyon.
Westcott & Greis, Inc.

Ladles, Hot Metal
Mueller Co.
Philadelphia Steel & Iron Co.

Lamps
C. B. Babcock Co.
General Gas Light Co.
Welsbach Company.

Lighters
C. B. Babcock Co.
Tappan Stove Co.

Lighting Incidentals
C. B. Babcock Co.
Welsbach Company.

Line Pipe—Iron
South Chester Tube Company

Line Pipe—Steel
South Chester Tube Company

Linings—Brickwork
J. N. J. Firebrick Co.
J. T. Thorpe & Son, Inc.

Linings—Car
Pioneer Paper Company.

Main, Bags
C. B. Babcock Co.
Mueller Co.
Safety Gas Main Stopper Co.

Mains, Street
United States Cast Iron Pipe and Foundry Co.

Main, Stopper
C. B. Babcock Co.
Mueller Co.
Safety Gas Main Stopper Co.

Mantles, Gas Lighting
C. B. Babcock Co.
General Gas Light Co.
Welsbach Company.

Manometers
Jensen Instrument Co.
Lee B. Mettler.
Westcott & Greis, Inc.

Meters, Air
Jensen Instrument Co.
Pacific Meter Works.
Pittsburgh Meter Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Meters, Boiler
Jensen Instrument Co.
Pittsburgh Meter Co.
The Foxboro Co., Inc.

Meters, Burner Test
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.

Meters, Cast Iron Gas
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.

Meter Connections
Lattimer-Stevens Co.
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.

Meters, Complaint
Pacific Meter Works.
Pittsburgh Meter Co.

Meters, Consumers
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.

Meters, Flow
Jensen Instrument Co.
Pittsburgh Meter Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Meters, Fluid
Jensen Instrument Co.
National Meter Co.
Pittsburgh Meter Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Meters, Gas
Jensen Instrument Co.
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.
Westcott & Greis, Inc.

Meters, Gasoline and Oil
Jensen Instrument Co.
National Meter Co.
Pittsburgh Meter Co.
Westcott & Greis, Inc.

Meters, High Pressure Distribution
Jensen Instrument Co.
Pittsburgh Meter Co.
Pacific Meter Works.
Sprague Meter Co.
The Foxboro Co., Inc.

Meters, High Pressure Iron Case
The E. A. Key Company
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.

Meters, Industrial Consumers
Jensen Instrument Co.
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.
The Foxboro Co., Inc.

Meters, Iron Case
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.

Meters, Laboratory
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.
Westcott & Greis, Inc.

Meters, Large Capacity
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.
Westcott & Greis, Inc.

Meters, Oil
Jensen Instrument Co.
National Meter Co.
Pittsburgh Meter Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Meters, Orifice
Jensen Instrument Co.
S. Herbert Lanyon.
Pacific Meter Works.
Pittsburgh Meter Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Meters, Oxygen
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.

Meters, Oxygen and Hydrogen
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.

Meters, Prepayment
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.

Meter Seals
Lattimer-Stevens Co.

Meter Shelves
Lattimer-Stevens Co.

Meter Swivels and Caps
Lattimer-Stevens Co.

Meters, Station
Pacific Meter Works.
Pittsburgh Meter Co.

Meters, Steam
Jensen Instrument Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Meters, Test
National Meter Co.
Pittsburgh Meter Co.
Pacific Meter Works.
Sprague Meter Co.
Westcott & Greis, Inc.

Meters, Water
Jensen Instrument Co.
National Meter Co.
Pittsburgh Meter Co.
Westcott & Greis, Inc.

Meters, Wet Test
Pacific Meter Works.
Pittsburgh Meter Co.

Mixers, Gas and Air
C. B. Babcock Co.
Geo. D. Roper Corporation.
Pacific Gas Heating Co.

Oil Condenser Sections
S. Herbert Lanyon.
Semet-Solvay Engr. Corpn.

Oil, Diaphragm
Pacific Meter Works.

Oxide
C. B. Babcock Co.
The Alpha-Lux Co., Inc.
E. J. Lavino Company.
A. R. Maas, Laboratories.

Paint
Eclipse Paint & Mfg. Co.
The Paraffine Co.s, Inc.
Everlasting Paint & Sales Co.
Hill, Hubbell & Company.

Paint—Black
Pioneer Paper Company.

Photometers
Pacific Meter Works.

Pilots
Payne Furnace & Supply Co.

Pipe
Semet-Solvay Engr. Corpn.
United States Cast Iron Pipe and Foundry Co.
Western Pipe & Steel Co.

Pipe Compound
E. A. Key Co.

Pipe, Copper
Mueller Co.

Pipe Covering
Everlasting Paint & Sales Co.
Hill, Hubbell & Company.
The Paraffine Co.s, Inc.
Pioneer Paper Company.

Pipe Cutters
W. W. Strickler & Bros.

Pipe—Iron
South Chester Tube Company

Pipe—Steel
South Chester Tube Company

Pipe Coils, Bends, Van Stone Joints, Gasketless Flange Joints, Welded Nozzle Headers
Philadelphia Steel & Iron Co.
Semet-Solvay Engr. Corpn.

Pipe Jointers
Mueller Co.

Plugs (testing mains and running service)
C. B. Babcock Co.
Jensen Instrument Co.
The Foxboro Co., Inc.
Safety Gas Main Stopper Co.
United States Cast Iron Pipe and Foundry Co.

Pre-Heaters
Baker Iron Works.
C. F. Braun & Co.
Southwestern Engineering Corp.
Western Pipe & Steel Co.

Producers, Gas
Semet-Solvay Engr. Corpn.
United States Cast Iron Pipe and Foundry Co.

Protective Coating
Everlasting Paint & Sales Co.
Hill, Hubbell & Co.

Provers, Meter
Pacific Meter Works.
Pittsburgh Meter Co.

Pumps
C. B. Babcock Co.
Ingersoll-Rand Co.
Mueller Co.
Oliver Continuous Filter Co.
Pacific Meter Works.
Geo. D. Roper Corporation.
Safety Gas Main Stopper Co.

Purifiers
Baker Iron Works.
Semet-Solvay Engr. Corpn.

Purifying Materials
The Alpha-Lux Co., Inc.
C. B. Babcock Co.
Connelly Iron Sponge & Governor Co.
A. R. Maas, Laboratories.

Purifiers, Oil Absorption
Western Pipe & Steel Co.

Pyrometers (Indicating and Recording)
Jensen Instrument Co.
Westcott & Greis, Inc.

Radiants
American Refractories Co.
C. B. Babcock Co.
General Gas Light Co.

Radiant Heaters
C. B. Babcock Co.
General Gas Light Co.
Pacific Gas Heating Co.
Welsbach Company.

Radiators, Gas-Fired
Pacific Gas Heating Co.
Potter Radiator Corporation.

Radiators, Gas-Steam
Pacific Gas Heating Co.

Ranges
C. B. Babcock Co.
Detroit Vapor Stove Co.
Geo. D. Roper Corporation.
Tappan Stove Co.

Ranges, Closed Top
C. B. Babcock Co.
Geo. D. Roper Corp.
Tappan Stove Co.

Receivers, Air
Ingersoll-Rand Co.
John Wood Mfg. Co.
Montague Pipe & Steel Co.
Western Pipe & Steel Co.

Recorders
Jensen Instrument Co.
Pittsburgh Meter Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Refrigerating Machinery
C. & G. Cooper Co.
Ingersoll-Rand Co.

Refractory Materials
Abrasive Engineering Corp'n.
The Alpha-Lux Co., Inc.
American Refractories Co.
S. Herbert Lanyon.
E. J. Lavino Company.
Los Angeles Pressed Brick Co.
Stockton Fire Brick Co.

Regulators, Heat
C. B. Babcock Co.
Arthur F. Erickson Co.
Payne Furnace & Supply Co.
The Foxboro Co., Inc.
L. R. Teeple Co.

Regulators, High Pressure
C. B. Babcock Co.
Chaplin-Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Mueller Co.
Reliance Mfg. Co.
Reynolds Gas Regulator Co.
Sprague Meter Co.
L. R. Teeple Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Regulators, Hot Water Heat Control
Mueller Co.

Regulators, Low Pressure
C. B. Babcock Co.
Chaplin-Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Reliance Mfg. Co.

Are You Really Trying to Increase Gas Consumption?

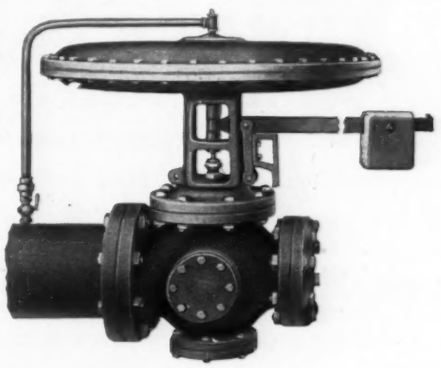
COPPER & BRASS
RESEARCH ASSOCIATION
25 Broadway – New York

YOU would not keep a salesman who advised consumers not to use gas. Water heaters made of corrodible metal are like salesmen working against the firm. Rust causes a steady decline in efficiency that is sure to reduce gas consumption.

Water-heating installations give a full, clean supply of hot water all the time when the vital parts of the heater are made of COPPER, BRASS and BRONZE. These metals never rust.

An Improvement!

The Fulton low Pressure Regulator is now equipped with a round side cap in place of the former rectangular cap. This increases the area of the side cap opening, making adjustments much easier. Nor is it necessary to remove the body from the line while making adjustments. With this improvement the lower valve will pass through the side cap opening. This new feature will prove of great value to the maintenance department of any gas company in the easier access to the regulator valve for replacement of valve seats.



Write for Catalogue

The Chaplin-Fulton Mfg. Co.

Organized 1884—Oldest Builders of Gas Regulators in the Country. Built in all Sizes, From 1 Inch to 24 Inches; For All Service. 1 oz. up to 1,600 lbs. Pressure to Square Inch.

28-34 Penn Avenue REPRESENTATIVES: **Pittsburgh, Pennsylvania**

WESTCOTT & GREIS, Inc.
Sales and Service
Dallas—Los Angeles—Tulsa

JNO. W. CRAWFORD
Sales Engineer
1855 Industrial St. Los Angeles

Mueller Co.
Reynolds Gas Regulator Co.
Sprague Meter Co.
The Foxboro Co., Inc.
L. R. Teeple Co.
Westcott & Greis, Inc.

Regulators, Temperature
C. B. Babcock Co.
Arthur F. Erickson Co.
Jensen Instrument Co.
Payne Furnace & Supply Co.
The Foxboro Co., Inc.
L. R. Teeple Co.
Westcott & Greis, Inc.

Regulators, Oven
C. B. Babcock Co.
Connelly Iron Sponge & Governor Co.
The Foxboro Co., Inc.

Repairs—Brickwork
J. N. J. Firebrick Co.
J. T. Thorpe & Son, Inc.

Resuscitating and First Aid Devices
Connelly Iron Sponge & Governor Co.

Retorts
Abrasive Engineering Corp'n.

Riveted Pipe
Montague Pipe & Steel Co.

Riveters, Pneumatic
Ingersoll-Rand Co.

Rivet Sets
Ingersoll-Rand Co.

Roofing
The C. & G. Cooper Co.
Pioneer Paper Company.

Rotisserie
C. B. Babcock Co.
General Gas Light Co.

Rust Preventatives
Everlasting Paint & Sales Co.
Pioneer Paper Company.

Safety Devices
American La France Fire Engine Co.

Seals
Lattimer-Stevens Co.

Scrubbers
Baker Iron Works.
Montague Pipe & Steel Co.
Southwestern Engineering Corp.
Semet-Solvay Engr. Corpn.
Western Pipe & Steel Co.

Selling Agents
S. Herbert Lanyon.

Settings, Boiler and Bench
S. Herbert Lanyon.
J. J. Thorpe & Son, Inc.

Sheet Metal
Baker Iron Works.
Montague Pipe & Steel Co.
Western Pipe & Steel Co.

Shingles
Pioneer Paper Company.

Specials
Steere Engineering Co.
United States Cast Iron Pipe and Foundry Co.

Stacks, Steel
Baker Iron Works.
Montague Pipe & Steel Co.
Semet-Solvay Engr. Corpn.
Western Pipe & Steel Co.

Stand Pipes
Baker Iron Works.
Montague Pipe & Steel Co.
Western Pipe & Steel Co.

Steel, Alloy
Philadelphia Steel & Iron Co.

Steel Plate Construction
Baker Iron Works.
Montague Pipe & Steel Co.
Philadelphia Steel & Iron Co.
Semet-Solvay Engr. Corpn.
Western Pipe & Steel Co.

Steel Work, Structural
Baker Iron Works.
Semet-Solvay Engr. Corpn.
Western Pipe & Steel Co.

Stills
Baker Iron Works.
C. F. Braun & Co.
S. Herbert Lanyon.
Southwestern Engineering Corp.
Western Pipe & Steel Co.

Stoppers, Gas Main
C. B. Babcock Co.
Mueller Co.
Safety Gas Main Stopper Co.

Stops, Brass
Mueller Co.

Stops, Iron Body
Mueller Co.

Strainer, Gas, Water, Air, and Oil
Mueller Co.

Systems
Payne Furnace & Supply Co.
Semet-Solvay Engr. Corpn.

Surface Irrigation Pipe
Montague Pipe & Steel Co.

Systems—Heating
C. B. Babcock Co.
Payne Furnace & Supply Co.

Systems, Hot Water Heat Control
Mueller Co.

Tachometers
Jensen Instrument Co.
Westcott & Greis, Inc.
The Foxboro Co., Inc.

Tanks
Semet-Solvay Engr. Corpn.
Western Pipe & Steel Co.

Tar Dehydrators
Semet-Solvay Engr. Corpn.

Thermometers (Indicating and Recording, etc.)
Jensen Instrument Co.
Semet-Solvay Engr. Corpn.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Thermostats, all kinds
C. B. Babcock Co.
Arthur F. Erickson Co.
Payne Furnace & Supply Co.
L. R. Teeple Co.

Thickeners
Oliver Continuous Filter Co.

Tile, Refractory
Abrasive Engineering Corp'n.
American Refractories Co.
Los Angeles Pressed Brick Co.
S. Herbert Lanyon.
Stockton Fire Brick Co.

Tools
Mueller Co.

Tools, Calking
Mueller Co.

Traps, Steam
Jensen Instrument Co.

Trench Excavators
C. B. Babcock Co.

Trench Work
Robertson & Company.

Trucks, Automobile
American La France Fire Engine Co.
The E. A. Key Company

Truck Tires
Truck Tire Service Co.

Tubes, Boiler
The E. A. Key Company
Semet-Solvay Engr. Corpn.

Tubes, Condenser
Semet-Solvay Engr. Corpn.

Tubing—Iron
Montague Pipe & Steel Co.
Muller & Co.
South Chester Tube Company
Semet-Solvay Engr. Corpn.

Tubing—Steel
South Chester Tube Company

Unions
Mueller Co.
Philadelphia Steel & Iron Co.
Pittsburgh Meter Co.

Valves, Back Pressure
C. B. Babcock Co.
Chaplin-Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Jensen Instrument Co.
S. Herbert Lanyon.
Reynolds Gas Regulator Co.
Semet-Solvay Engr. Corpn.
Westcott & Greis, Inc.

Valves, Electro-Magnetic
C. B. Babcock Co.
Arthur F. Erickson Co.
S. Herbert Lanyon.
Potter Radiator Corporation.
L. R. Teeple Co.

Valves, Gas Engine
The C. & G. Cooper Co.

Valves, Gate
Baker Iron Works.
Philadelphia Steel & Iron Co.
Semet-Solvay Engr. Corpn.

Valves, Needle for Gas Stoves
C. B. Babcock Co.
L. R. Teeple Co.

Valves, Relief
Chaplin-Fulton Mfg. Co.
Robertson & Company.
Connelly Iron Sponge & Governor Co.
Jensen Instrument Co.
S. Herbert Lanyon.
Mueller Co.
Reynolds Gas Regulator Co.

Valves, Plug
Jensen Instrument Co.
Lattimer-Stevens Co.
Merco Nordstrom Valve Co.

Valves, Thermo
Arthur F. Erickson Co.

Varnishes
Hill, Hubbell & Company.

Vent Pipe
Mueller Co.

Vulcanizers (Tube) Gas
Reliance Mfg. Co.

Washers
Semet-Solvay Engr. Corpn.
Western Pipe & Steel Co.

Water Gas Equipment
Semet-Solvay Engr. Corpn.

Water Heaters
C. F. Braun & Co.
Beacon Water Heater Co.
S. Herbert Lanyon.
Pacific Gas Heating Co.
Rotary Manufacturing Co.
Welsbach Company.
John Wood Mfg. Co.

Waterproofing Materials
Pioneer Paper Company.

Welding
Commercial Acetylene Co.
Donald A. Holm Co.
Montague Pipe & Steel Co.
Robertson & Company.
Semet-Solvay Engr. Corpn.

Welded Pipe
Montague Pipe & Steel Co.

Welding Rods
Commercial Acetylene Co.
Donald A. Holm Co.
Philadelphia Steel & Iron Co.

Well Casing
Montague Pipe & Steel Co.

Wire
Philadelphia Steel & Iron Co.

Yarn, Calking
Pioneer Paper Company.

ALUNDUM—CRYSTOLON

Heavy Duty Refractories

For All High Temperature Uses

Complete Stock of 9-inch Standard Bricks, Tile and Cements Carried

Phone TUcker 3452

Abrasive Engineering Corporation

Refractory Division

NORTON COMPANY HEAVY DUTY REFRACTORIES

617 E. Third Street **Los Angeles, Calif.**

Announcement

The C. B. BABCOCK COMPANY, 135 Bluxome Street, San Francisco, Calif., has been appointed Pacific Coast representative for the undersigned.

We are manufacturers of: Purifying Material, Automatic Station Governors, Balance Governors, Mercury Seal Governors, Service Governors, Back Pressure Valves, Testers, Counterbalanced Cast Iron Manholes, Gauges, etc.

CONNELLY Iron Sponge & Governor Co.

New York
Chicago
San Francisco

Sell Us Your Spare Time

TURN ODD HOURS INTO CASH, by telling your friends in the Company that you represent ***WESTERN GAS,*** and to let you send in their renewal and new subscriptions.

Our big commissions make it possible for you to earn two or three dollars during a spare hour.

We have openings for men or women who have spare time. To represent us in the following states; Colorado, Wyoming, Oklahoma, Texas, Louisiana, Arkansas, Kansas, Missouri, Iowa, Nebraska, Minnesota, North Dakota and South Dakota. Send us your name, address, age, also give us the name of one gas company official as reference. WESTERN BUSINESS PAPERS Inc., 626 South Spring Street, Los Angeles, California.

Lux Material
BEST GAS PURIFIER
THE ALPHA-LUX CO., Inc., 192 Front St., N.Y.

LAVINO OXIDE
FOR GAS PURIFICATION
E. J. LAVINO AND COMPANY. BULLITT BLDG. PHILADELPHIA, PA.

Mettler Entrained Combustion Gas Burners
FOR ALL Purposes Kinds of gas Pressures
406 S. Main St. LEE B. METTLER. CO. Los Angeles Cal.

DIRECTORY

Byllesby Engineering and Management Corporation
231 S. La Salle Street
CHICAGO
New York Tacoma San Diego

AMERICAN-LAFRANCE FIRE ENGINE CO.
2339 E. 9th St. Los Angeles, Cal.
Fire Protection Equipment

SWEDISH WELDING RODS
T H BRAND
Stocks Carried By
DONALD A. HOLM CO.
Exclusive Pacific Coast Agents
2261 E. 15th St. Los Angeles Telephone TRinity 7585

SILICA GEL
for
CASING HEAD GASOLINE ADSORPTION
SIMPLEST SYSTEM
Carl C. Thomas
Union Oil Bldg. Los Angeles

ROBERTSON & COMPANY
Pipe Line Construction, Machine Ditching and Backfilling
Boring Boulevards and Railroads
Compressed Air Equipment
For Concrete Breaking, Rock Drilling and Pipe Line Testing
800 E. 61st St. Phone AX 6821 Los Angeles

S. HERBERT LANYON
SALES ENGINEER
Representing: SCHUTTE & KOERTING CO.
M. H. DETRICK CO.
LAPP INSULATOR CO.
New Call Bldg.—San Francisco
Transportation Bldg.—Los Angeles

ORIFICE METERS
Orifice Meter repairs, maintenance Chart Service, etc.
Authorized Westcott Service, Reference: Westcott & Gries
Los Angeles, California
J. C. HUNTER
"Industrial Engineering Service"
646 South San Pedro Street Los Angeles, Cal. MAin 1737

JNJ FIREBRICK CONSTRUCTION CO.
Specializing in Gas Generators and Boiler Installations
475 Stevenson St.
SAN FRANCISCO
25 Years' Experience
Estimates Furnished
Particular attention to Repairing
Prompt and Efficient Service
Phone Kearny 3850

Advertisers' Index

Abrasive Engineering Corp. 76
The Ac-Me Co. 54
The Alpha-Lux Co., Inc. 77
American Refractories Co. 70
C. B. Babcock Co. 50
Baker Iron Works 66
Beacon Water Heater Co. 66
C. F. Braun & Co. 10-11
J. A. Campbell 16
Chaplin-Fulton Mfg. Co. 75
Commercial Acetylene Supply Co., Inc. 73
Connelly Iron Sponge Co. 76
C. & G. Cooper Co. 45-46
Copper & Brass Research Assn. 75
The Detroit Vapor Stove Co. ..... *Third Cover*
The DeLaval Separator Co. 17
Eclipse Paint & Mfg. Co. 64
Arthur F. Erickson Co. 58
Everlasting Paint & Sales Co. ..... —
The Foxboro Co., Inc. 13
Fluor Construction Co. 1
General Gas Light Co. 51
J. G. Gill Corporation 48
Hoffman Supply Co. 69
Hill, Hubbell & Co. 52
Ingersoll-Rand Company 3
Jensen Instrument Co. 58
E. A. Key Company 62
Lattimer-Stevens Co. ..... *Fourth Cover*
E. J. Lavino & Co. 77
Los Angeles Pressed Brick Co. 73
Arthur R. Maas 60
Merco Nordstrom Valve Co. ..... *First Cover*
Lee B. Mettler Co. 77
Montague Pipe & Steel Co. 62
Chas. C. Moore & Co. 68
Mueller Co. 9
Oliver Continuous Filter Co. 14
Pacific Gas Radiator Co. 49
Pacific Gas & Electric Co. 12
Pacific Meter Works 6
Paraffine Companies, Inc. 68
Payne Furnace & Supply Co., Inc. 48
Pioneer Paper Co. 69
Pittsburgh Equitable Meter Co. ..... —
Potter Radiator Corp. 53
Reliance Manufacturing Co. 56
Remington Typewriter Co. 7
Reynolds Gas Regulator Co. 68
George D. Roper Corporation ..... —
Rotary Manufacturing Co. 66
Safety Gas Main Stopper Co. 8
Semet-Solway Eng. Corp. 18
Smith-Emery Co. 62
South Chester Tube Co. 60
Southwestern Engineering Corp. ..... *Second Cover*
Sprague Meter Company 71
Standard Gas Equipment Co. 63
Stockton Fire Brick Co. 67
W. W. Strickler & Bros. 70
Tappan Stove Company 55
L. R. Teeple Company 57
J. T. Thorpe & Son 67
Truck Tire Service Co. 4
Union Tank & Pipe Co. 50
U. S. Cast Iron Pipe and Foundry Co. 5
Volz Engineering Equip. Co. 65
Welsbach Company 59
Westcott & Greis, Inc. 15
Western Pipe & Steel Co. 56
The Wilcolator Co. 61
John Wood Mfg. Co. 47

This one feature *alone*

closes many White Star GAS RANGE sales

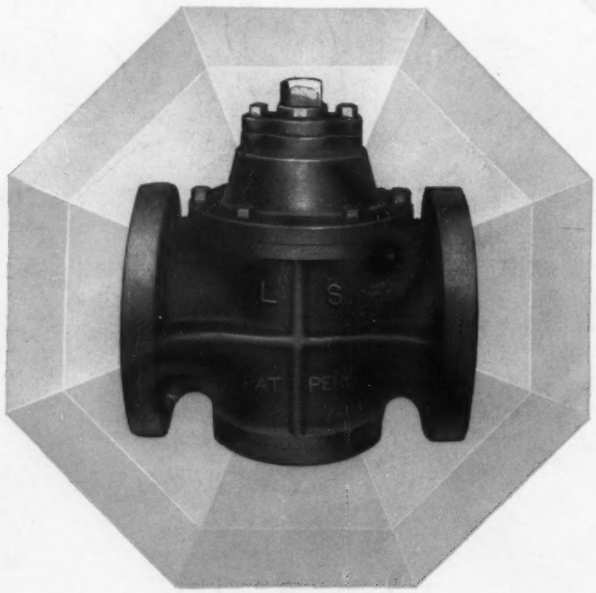
This burner is years ahead in design. Its Even-Heet feature amounts to a new principle of burner construction. Each embossed port in every section of the burner area gives exactly the same even heat and perfect combustion. This makes for better cooking.

It is the experience of utility salesmen the country over that the White Star's fourteen instantly visible betterments literally sell this range on sight. These features, with surprisingly low prices, are sweeping White Star to enormous sales totals. Send today for the details! Let White Star pile up volume sales for you at a profit.

THE DETROIT VAPOR STOVE COMPANY
Detroit, Michigan
A. C. MERZ, Representative, 1925 Eighth Ave., Los Angeles, Calif.

White Star
GAS RANGES

652



L-S

Single Action Plug Valve

LESS than one full turn of the head of the Lattimer-Stevens single action plug valve breaks the seal by a slight mechanical lift, turns the plug to full opening and reseats it.

The greater the force used in turning, the tighter the plug is reseated with positive assurance that the seal of the plug and body may be broken when turning of the valve is again necessary. Write for additional information.

THE LATTIMER-STEVENS COMPANY

72 Yale Ave., Columbus, Ohio

New England Representative
The Eastern Service Co.
Boston, Mass.

San Francisco Representative
A. P. Bartley
67 Second St.

Chicago Representatives
The Utilities Service Co.
122 S. Michigan Ave.

LattimerStevens
METER CONNECTIONS-SHELVES
STOP COCKS AND SEALS